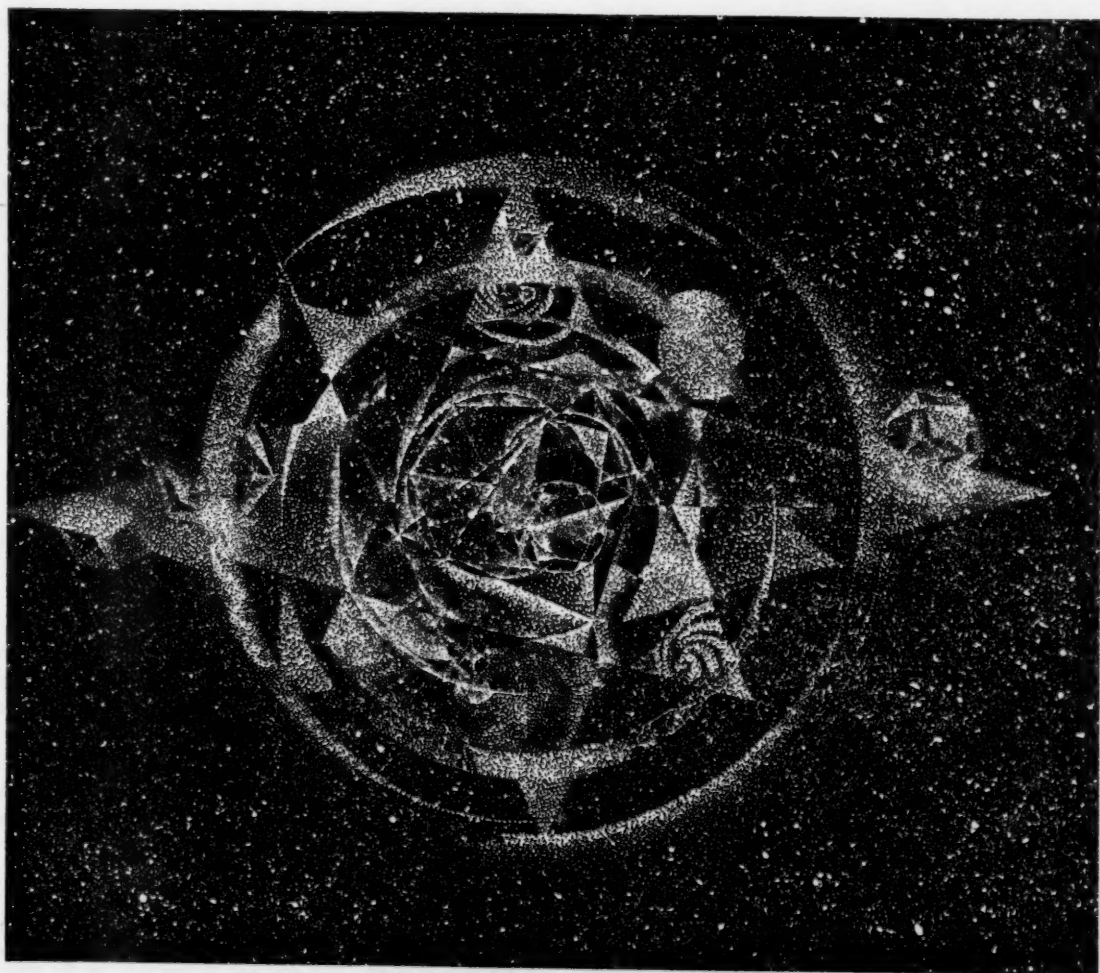


MAIN CURRENTS

IN MODERN THOUGHT

SUMMER

1947



DIVINE IDEATION

A Drawing by A. J. GOUFFE

MAIN CURRENTS IN MODERN THOUGHT

A co-operative journal to promote the free association of those working toward the integration of all knowledge through the study of the whole of things, Nature, Man, and Society, assuming the universe to be one, dependable, intelligible, harmonious.



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"Ah, but a man's reach should exceed his grasp, or what's a heaven for?"

—BROWNING

AN EDUCATIONAL WAY OUT.....Editorial Summary

CONCEPTS, and the World Crisis.....Our Editorial Policy

I The Realization of New Needs

II A Proposed Technique

III The Task is Urgent

READING TOWARD CONCEPTS.....A Reasoned Bibliography

THE PHILOSOPHICAL BELIEFS OF LEADERS IN AMERICAN EDUCATION

A Study by Frank C. Wegener, University of Southern California

I Description of the Survey

II The Statements of Belief

III Dr. Wegener's Summary, Conclusion, and Recommendations

THE FOUNDATION FOR INTEGRATED EDUCATIONAn Announcement

THE DRAWING ON THE COVER of this issue of MAIN CURRENTS is by A. J. Gouffe, to whom we take occasion to express our gratitude. It represents the concept of Divine Ideation, the sense of order underlying the celestial bodies, unseen, unheard, but all-pervasive. This idea is summed up in the Greek term Logos, the intelligible latency disclosed by the evolution of the system and perceived by man. The notion that the primordial universe presents itself first as a duality or polarization is as old as civilization. To it the Greek thinker gave the names Logos and Chaos. Implicit is the notion that the primordium itself manifests directly as Cosmos. Thus we have a triplicity of elementary ideas, Logos, Cosmos, and Chaos, corresponding to the modern perception of self-conscious intelligence, life, and energy. This triplicity runs throughout all religions of a higher order, usually personalized and even anthropomorphized.

MAIN CURRENTS IN MODERN THOUGHT is published quarterly to call attention to significant contributions to learning currently being made by leading workers in the multiple fields into which knowledge has come to be classified. It relates these advances to each other and to the classical and contemporary views of Eastern, European and American thinkers. It is designed to save time for the reader by providing a vantage-ground from which the whole world of knowledge may be surveyed and kept in proportion as it moves toward integration. Its editors assume that the principles of art, the universals of philosophy, the laws of Nature and Man as formulated by science, and the truths of comparative religion, can be orchestrated into a harmonic, meaningful, ethical body of teachings which can be and should be made the central core of curricular study in the educative process at all levels of development. In condensing text, square brackets [] indicate editorial interpolation. Three dots . . . in the text indicates a word, phrase or passage omitted in the interest of brevity or clarity. Other usages are standard. \$3.00 a year. Contributors to MAIN CURRENTS enjoy full liberty of opinion and of expression in these pages. Copyright 1947, by F. L. Kunz, Editor, Port Chester, New York, to whom all communications regarding MAIN CURRENTS IN MODERN THOUGHT should be addressed. E. B. Sellon, Associate Editor. Entered as second class matter April 13th, 1946, at the post office at Port Chester, New York, under the Act of March 3rd, 1879

AN EDUCATIONAL WAY OUT

Editorial Summary

Thoughtful young men and women returned from college this summer with a dark cloud, small and distant but lowering, upon the horizon of what should be hopeful lives. That they are stoic, resigned, or silent about "the next war", or seem indifferent or distracted by urgencies and pleasures in daily living, diminishes in no degree their awareness of the peril being countenanced for their generation by elders. Their campuses are still crowded with students from the battlefields, many whose muteness reports better than words the new terror of multi-dimensional warfare. Courses of study and convocation addresses have turned their arguments and rested their conclusions upon this closing-in of a truly global *terreur*.

Some of these studies and speeches discussed the possible prevention of the dismemberment and death of millions of present student youth, but with little hope and less conviction. For the only familiar instruments, politics and finance, which are expected to contrive such a peace, are in the hands of people far away and beyond control. Walter Lippman put in words (May 20th) what has long been seen by many, that our present foreign policy originated verbally in the Fulton speech of Winston Churchill. The fateful issue, thus, as of today, would seem to be far out of reach of the educational world, and parents appear to be in the position of committing a whole generation to go on to a doom not of their own making, which is bad enough, but helpless in the custody of others who are not in accord with our historic American purposes.

Here is a monstrous responsibility. Adults not hopelessly hardened or quite witless with fright should be impelled to consider what new instrument could be devised at once, and therefore in time, to bring the force and enlightenment of united faculty and student body into play, so that our youth can affect measurably and increasingly their own destiny, abate through their own present actions the likelihood of war—and this not by fruitless campus political activity, useful as that is as exercise, but by appropriate and gradually concerted adjustments in their whole educational experience.

It is our duty, in short, to ask insistently what can and should be taught so that the world will be led to peace. What truths can we proclaim within our own country, which will have decisive effect here and in all other countries, without exception?

We shall propose an answer, after first raising and dismissing a despairing doubt which is a deterrent to interest in an educational solution. We are asked: "Suppose war to be five years away, at earliest, would purely educational activity have sufficient effect to slow the momentum toward conflict, so that the 'breathing spell' would lengthen, giving us in turn more time in which to be effective through education? Is it not too late even to begin?"

For a general national change in all pertinent educational practices, the time left to us is obviously too small, and if that is the only possibility we would do better to dismiss our hopes at once, and prepare with all our power for the savagery ahead. This, in fact, is what some conspicuous leaders in education seem to be doing, as a result of their pessimism and of the influence upon them of war-preparation and war-waging during the last seven or eight years of their association with atomic bomb and other enterprises. But we may be permitted to believe them in error, and to say that in their own colleges, universities and institutes lies the cause of the disquiet which drives them and us on to disaster.

If this can be shown, then the cure will be seen just as close at hand as the cause, and the start can be made here and now. We need the mere beginning of a change in educational philosophy, orientation to a certain kind of conceptually integrated education. Although a general change even in educational purpose is doubtless a slow process, the initial stages could be rapid. Experiment shows that opening phases of such an experience, now entirely practicable, are charged with hope. Hope communicates itself. If a firm beginning be made with uttermost promptness, the country could quite reasonably be expected to respond progressively.

Suppose that a few liberal arts colleges, one or two universities, and one teachers training college (quite random figures) were to be aided to set up and make known in 1948 and 1949 courses of study and thought fairly certain to have the specific and desired effect (to be shortly hereafter described). Let the institutions in question be selected from the not inconsiderable number which are already hopefully and persistently experimenting with programs which may lead eventually anyhow to that desired effect. By starting with them, advantage is taken of work done thus far. With that start, mostly at the general education level, good advance could be made in two years in defining the needs and experiencing the effects, through proper concentration and adequate expenditure at the liberal education level. Progress made in the pilot-plant colleges would unfailingly come to be known widely through educational conferences and journals, *MAIN CURRENTS* among them, and as the studies are seen to have the effect intended, certainly another fifty progressive institutions can be counted upon to see the possibilities and to be doing something by 1950.

Fifty colleges are only about one out of each two hundred institutions of required rank on this continent, but if they are individually effective and geographically well distributed, their faculties (perhaps a thousand or more persons) and students (possibly thirty thousand) would be by 1952 the bearers of news and hope of a fresh way to get at the world problem.

This reasonable beginning can easily have the required effect, for the fear among mankind is so intense that

every educated convert from despair to hope would be a social force. To free a few thousand people from the general massed-up feeling that nothing can be done is the necessary beginning of a great and quite practicable change. The binding electron of an atom has relatively little mass, but its velocity, spin, angle, direction and degrees of freedom make it a decisive factor in any new chemical bond. Similarly, each year which widens the influence of the new integrated conceptual program means a multiform response in the entire body social, as conveyed by the families of the students, the faculties, alumni, and others.

In education we are working at the level of leadership, where every effort has magnified effects. Further, we are a literate nation, and the hopes and works of leaders can be widely known in the country. Even if but simply understood, the gains would be progressively general.

Educational changes are being made in any case. Those which signify the achievement of peace through insight and moral leadership are sure to stand forth.

Finally, the alternative is war, as things now stand. We shall not need to begin it, nor Russia. It will be enough for some incident to occur, perhaps in Turkey. Where then will be the most progressive or the most inert of colleges and universities alike, under a rain of bombs and enveloped in the miasma of poisoned vapors? Far from being a cause for despair, the shortness of time is reason for starting at once, and no reason whatever against trying.

Holding firmly to the reasonable conviction that there is yet time, we may now ask: What educational change is proposed and what will be the effect of it upon American ideals and practices, so that world peace can be won under our contributory leadership?

In addressing our minds to this we must make a simple distinction between ideal and fact in life. That typically American instrument of social change, the automobile, can function once more in its familiar role of example. It is a serviceable instance, because such social afflictions as the incidence of divorce, murders of children by children, lynchings, heart disease, and many nervous and mental disorders, contain quite large elements of psychological cultural failure and make it difficult to see with stark clarity the issue we need to define. In all these cases we tend, as a people, to think mainly of the ideal and secondarily of the practice; and when practice fails, we avoid with something like fear any close consideration of the conceptual linkage which should tie ideal and proper practice together. In the case of the motor car, the ideals which created it, and the practical effects of its existence stand well apart, and the conceptual void is conspicuous between.

American ideals of freedom, progress, economic opportunity and equal chance for all were among the promptings which brought forth the nearly universal use of the automobile, which ranks now with food, clothing and shelter as items of main expenditure of money. We shall assume that travel in a Crosley (our current

envy!) is about equal opportunity to travel in a Buick. The result is highway driving at good speeds by millions, a new democratic social circumstance which enlarges people's freedom.

No one quarrels with this, but there is the attendant new social invention that comes as a by-product, autocide. It is new because, in fact, the American people do not rank killings on the highway as homicide or suicide. The law, by introducing restrictions and punishments, tries to class autocide among acknowledged crimes. But the people make a distinction, and in fact a driver is often exonerated if he "innocently kills a heedless child," while a mother who, under some dire necessity of poverty, leaves a child at home and causes its death, may be punished. Courts deal with autocide by case law, judging the individual instance against a mixture of old concepts of all kinds, together with incidentals of sobriety, recklessness, and the like. Meantime autocide does not abate.

The assumption about cars is unquestionably that we are a free people, free to go a mile a minute, free to die if we like, and free to kill others unintentionally. Who examines the conceptual difference between freedom on the highway as it was in 1847 and freedom on the highway as a fact in 1947? In this case we see plainly that the American ideal, so rightly defended and so competently worked out into a vehicle, has made us the most kindly homicidal nation per capita on earth in all history, because we have not yet raised and answered the question: Is man made for the auto or the auto made for man?

In most of our social, political and economic miseries there is a function to be filled by concepts between the ideal and the practice. If space allowed, discussion of the next war could properly include prior reference to a variety of examples, much more complex than the case of the automobile. For the imminence of war is related to those many instances where, in the name of American ideals, those same ideals are denied in practice. The very core of freedom is decaying before our eyes at home while we prepare to go abroad in its defense. The position today is comparable to the times of the Alien Act. For the sake of brevity, we postpone other instances and leave our one example to stand for all.

It is necessary to be clear that there is no substitute for a form of education which supplies the conceptual connections. History, for example, is no alternative. Anyone about thirty or forty years old actually lived through the history of fascist Italy and nazi Germany. He does not need to read of it in retrospect. Yet he may be unable to see that same history now repeating itself in this country. When he saw it abroad he was incapable of framing it in a philosophy of life based on the required broad concepts. It is axiomatic that no one understands any particular save he be equipped with the necessary abstract principles which set that one instance alongside all others, and thus is able to act confidently upon principle, not on mere expediency smoothed over with ideal-

istic words. Concepts and concepts alone make such conduct possible.

There is, then, no substitute, and we have only to see how the impending war can be avoided by that conceptual development among us which will give us again the moral ascendancy which enables us to dispense with reliance upon arms. We have the needed ideals; and we are generous, resourceful and industrious. But we are confused. Russians have parallel and comparable qualities of various kinds, but they have one deceptive advantage which is our temporary disadvantage. They are not *ideologically* confused. They are mistaken. When we act from clearer knowledge, and from as great a certainty, we can provide that leadership which at present we fear in them. We have only to discover in what way the Russian assumptions are mistaken, and then to display full competence in our corrective action.

Social and economic thought in Russia is a modified form of the materialism of the crassest days of the nineteenth century physicalism. The opinions dependent upon the science that was prevalent in the times of Marx are today obsolete everywhere, including Russia, because the mid-nineteenth century scientific background is obsolete. Although the philosophy which Engels imported into their common writings was superior to the scientific thinking of the day, as philosophy so often can be, Marx dominated their joint work, and we see in Russia a social, economic and political system which roots in outmoded scientific thought. This circumstance merits close attention. Its significance is heightened by the fact that Christianity came to Russia in the Greek Catholic form, and far later than to western European nations. The artistic and mystical nature of the Russian tradition and the wonderful texture of the lingual and folk inheritances also come into play. The Russians passed directly from feudalism to mass-production. All this and more comes into consideration.

The Russian ideal includes equal opportunity, universal education, the right to work, and many other aims. We applaud those, and the war is not about them. Nor, on the record, is the war about territories, or spheres of influence. We are not even urged on by the fact that the Russian economy requires only a gross of 13% return to keep it going, whereas ours requires 20%. The conflict is aggravated but not caused by Russian censorship or the "cellulose curtain" (the American press) which function as two controls upon the free circulation of the truth. The war arises from a conscious and semi-official dialectical materialism in Russia, and a confused half-defeated spiritual purpose at conflict in the United States with domestic policy and practical facts. We feel our intellectual fragmented purpose, and lead therefore from our physical strength. The Russians know they are physically weak, and act from their feeling of ideological certainty. A war will not prove which party is right about its political, social and economic theory, but the acquirement by us of as sharply focussed a social concept as the Soviets possess may very well make war unnecessary.

Novel as this proposal may be to some, it can be defended. Slavery was justified by many of its apologists in the past on the ground that there were no souls in Negro bodies. Brutal imperialisms have been defended on the ground that the conqueror brought civilization to his subjects. Such mistaken views in the end destroyed the aggressor. When they are opposed by systems more correct in their philosophy, inadequate societies, untrue to the laws of the universe, invariably decline.

We are right in our ideals, but upon a great variety of outworkings of those ideals we have not done the work required to enable us to implement our rightness. In fact, domestic problems show that we have not thought our way through. Nor are partisan feelings or scapegoat seeking helpful substitutes.

The conclusion to be drawn from the argument is that the colleges and universities are in a position to provide the concepts we need. Those concepts will validate the American way of life in all its primal ideals. They will also show *how* the practices can be made to implement the ideals. When knowledge has been progressed to the point where the nation begins to have convictions as clear as those of Russian thinkers, and grounded in a better conscious outlook, we shall have a moral and philosophical strength enabling us to give leadership. Thus the task of saving this nation and the world rests squarely upon American educators' leadership.

What is asked of them?

They are required to examine the multitude of new scientific facts and principles which have come to light since the time of Marx and Engels, which those thinkers could not know. The nature of the new discoveries validates what is important in religion, having precisely an opposite effect to the crass materialism of the mid-nineteenth century. As dialectical materialism and certain events led to a social theory, so the present available valid metaphysics and philosophy (in brief sometimes called transcendental realism) will lead through certain other events to a social philosophy. In so far as this country is really devoted to human brotherhood, the new social philosophy will turn out to be the same as the familiar American ideal—but now it will be powered by a thoroughly worked-out reason which today is missing.

The development we are anticipating will be different from the adaptive course of deducing our educational philosophy from a changing social scene. This was all very well when nothing better offered, but it has been obsolescent for years, and is now positively misleading. The kind of pragmatic sanction which present day science gives us is quite different from the kind of pragmatism which instrumentalism implies, by reason of advances made in biology and psychology.

We have thus also before us an alternative to indoctrination, which is so offensive to our American purpose. There are great blocks of knowledge to be worked up by all concerned, teacher and student alike and together. This will be a progressive process. It will be attended by

satisfactions of all kinds. Present day science, properly organized, justifies religion. Hence, as the studies advance, a new and mandatory force of reason will be given to familiar and beloved beliefs, in future to be seen to be higher levels of universal law. While these philosophical gains are restoring ethical force in American life and affecting marital, economic, political and all other relationships, the materialism of Russia will be likewise affected, for the prestige of science is nowhere in the world higher than it is in that country. The present confusion in thinking between ourselves and the Soviet peoples will be steadily cleared up. As seen by them, our religious ideals ill consort with our social and economic severities, the more conspicuous because we have plenty. As seen by us, the actual facts of voting and other procedures seem entirely inconsistent with their stated ideals. Each party explains away its own failures, and prepares to rest its case upon force—prepares, perhaps, with equal reluctance on both sides.

There is surely but this one alternative to the violence ahead. It is practical and immediate. We have but to admit that there is another contemporary synthesis of knowledge now imperatively demanded of us by the scientific developments of recent times. We have then to achieve some measure of that synthesis. We shall thus have a scientific ideology far superior to Russian theory. The work of the United Nations and UNESCO will also acquire a new force, in truth a new sanctity. Religious traditionalism will be revitalized from the metaphysics of a better philosophy. Sectarian, sociological,

political and even economic divisions will slowly be closed from within, through the healing effect of a superior outlook. The world disease will at last be treated at the causative level, and not symptomatically. Righteousness and denunciation can be slowly supplanted by reason and discernment.

In these circumstances the philosophical views of American educators become, odd as it may seem, the most important field of inquiry and for action in all the manifold aspects of our life. Readers will find in these present pages a condensed account of the most thorough study thereof made to date. Dr. Wegener's restrained and careful language makes all the more telling the effect of his findings, which are most important where they show how divided is the allegiance within the mind of the individual educator, between his ideals and his realism. No more important inquiry has been made, we suggest, in many years. The thorough documentation will be seen upon publication of the whole work, which will be imperative reading for this country. It would be difficult to think of any more important survey than this one, finding out with such precision the state of mind of our teachers, and of revealing it to them. When the facts are presently before the country, we can be much more effective in the great work of disseminating the conceptual materials which will put an end to the divided allegiance to the ideal and to the real—as if they were different—which now paralyzes our democracy at its source, in the educational system itself.

F. L. K.

What We Must Do

We have one foot in a civilization that is dying and another foot in a civilization that is struggling to be born. Consequently we live a kind of bifurcated existence and the gap between what we know and what we need to know becomes wider and deeper. (Rockefeller Foundation Review for 1946)

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The two greatest powers that have come to the world have never been fully developed. These are spiritual power and education power. If we will do a better job in the development of these two powers, I think they will guide us in the proper use of all other powers. (Thomas J. Watson, President, International Business Machines Corporation)

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A better world will be created only by better people . . . Educationally, in the main, we are continuing to entrust our children to a system which has been inherited from the past. It simply will not measure up to the kind of a world we face today. We need a twentieth century educational system to cope with the twentieth century problems we have to deal with. (Herman W. Steinkraus, President, Bridgeport Brass Company, in the Magazine THINK)

How We Shall Do It

One of the primitive assumptions of science is that we live in a universe of order . . . This assumption states that there is a metaphysics, a body of universal laws which can be grasped by the human intellect and utilized effectively in the solution of human problems. (Dr. H. S. Burr, Yale Medical School)

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We are devotees of the end—the commanding and glamorous end; but we have no patience with the essential means, the indispensable means by which the worthy end is to be achieved . . . It is as though we have established our right to know but have not made our people competent to know. (Francis P. Gaines, President, Washington and Lee University)

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We must make education connect more directly and explicitly with the forthright pursuit of truth. The love of truth and the disinterested pursuit of it lie at the very heart of freedom. It is high time that our schools and colleges dealt more explicitly and responsibly with their obligations to moral order in American democracy. (Edmund E. Day, President Cornell University, in a commencement address)

PART I

The Realization of the New Needs

The outbreak of the war in 1939 convinced certain democratic Americans that mankind's problems must be re-examined in terms of root causes and fundamental cures. Like all well-informed observers, these thinkers were concerned over the patent fact that the democracies were now fighting for the second time within a generation and for their very existence, and that in the same period their internal unsolved problems had become greatly intensified. It was reasonable to believe that a connection should be sought between these two circumstances.

Since this group believed that the springs of health for democracy lie in right education, they assembled in 1940 as a Conference on Science, Philosophy and Religion in Their Relations to the Democratic Way of Life, having present or at their call the leaders of thought in the United States and some from abroad. The first session of the Conference showed conclusively that the vast complex of scientific, technological and industrial advances had created a society into which the young citizen emerges quite inadequately equipped in two ways: 1.) He passes through a schooling which has no proper conceptual simplifications by which he can reduce the body of knowledge from the descriptive level—where it is of unwieldy magnitude and intolerable intricacy—to a useful and valid philosophy of the good life; and 2.) he is not able to discharge his functions politically and socially because he finds today's society as complex and unmanageable as are the educational materials.

The young citizen finds himself unable to cope with both these mazes; bewildered by the first, he is naturally overcome and defeated by the second. The conclusion derived from this is that simplification of the curricular complex would offer him the standards by which he might conquer the social issues.

The Conference was called with the prior assumption that specialization in the various departments of education made it impossible for specialists to command a common language with which to achieve the required simplification from the descriptive to the conceptual level. The first meetings in 1940 confirmed this assumption, and the third session, in 1942, was featured by a formal public announcement of this failure. The cross-purposes attendant on the stalemate led to more than one fission, and the starting of new Conferences. Although the original Conference has continued its yearly meetings and publishes an annual symposium, and though some of the daughter conferences have continued to meet throughout the war and since, the steps to achieve the required conceptual gains were taken by none of them.*

*See MAIN CURRENTS, April, 1946, pages 42 to 48 for an extended discussion of this whole development.

As this defect began to be apparent, many colleges and universities addressed themselves to the problem, and many secondary adjustments in method and content of education have resulted. But we must be clear on the point that *the major problem remains unsolved*. The reasons for the failure are several and have important bearing upon our present proposals, but first we must emphasize certain conclusions from the foregoing:

Leaders of American thought have realized, and publicly admitted in print, that education in the United States of America failed for many years to provide the *kind* of educational experience which the citizen requires if he is to do his duty in a modern democracy.

This discovery is a great gain. It means that *what has to be done educationally is exactly understood*, in contrast with the confusion, fear, and essential stalemate existing in social, political, and economic thinking. It means that educators recognize the conceptual breakdown of our times, and know it is impossible any longer to expect the educational system to cope at the descriptive level with the vast complex of new data and new adjustments involved in a contemporary mass-production society. Simplification at the deeper level of concepts must be achieved and made available, first in colleges and universities, then in the later years of high school, and eventually reflected into still earlier years of education.

The integration to be sought must be significant as regards the social, economic and political realities at national and world levels, as well as in the relation to the intellectual, aesthetic, and other materials of the curriculum.

The achievement must be made by, and must satisfy, university thinkers and conform to scientific requirements, yet be brought within the reach of secondary schools to reach the majority of young citizens.

The events described had their effective beginning in 1940. Shortly thereafter the war came closer, and then actually upon this country. As far as the institutions of higher learning were concerned, the war had to have first attention. During that struggle it was quite impossible for a college or university to go through the work of revising its curriculum in this fundamental sense, even if the faculty could have found the time and the principles upon which to proceed. Military requirements had to come first. The Conferences continued, as we have said, but they no longer concerned themselves with the problem of conceptual development as if it were urgent. No continuing secretariats were set up by any group to carry through a step-by-step program of conceptual gains, nor was it possible to make sustained efforts to arrive at a procedure or to state principles.

The risks we run as a nation through this educational failure had not, in 1944, come home to the leaders of the country at large, nor have they even now. Educators, philosophers, scientists, and others have shown deep concern, but principally before the crisis of feeling precipitated by the Hiroshima bombing. The public, including many persons of responsibility, has been distracted by this immediate danger to human society, and has rather generally lost to sight the fundamental problem we are discussing.

A few institutions of learning have indeed been roused to see the connection between the educational failure and the ethical and social breakdown of our times, as well as the economic and political confusion recorded daily in our newspapers. But since the war has come to its end, the engorgement of the campuses with veterans has prevented all except desultory pursuit of the lead so well given. After all, educators are the servants of the public. They have succeeded in bringing a basic problem out into the open. So much certainly is their responsibility and they have discharged it. The agencies of public communication, swamped by forces old and new, have failed to do their part. Hence the wherewithal to attack their problem has not been put into the hands of the educators who have recognized the need.

Today scattered individuals and small groups work upon various secondary aspects of the central issue. A few colleges and universities have set up general colleges, basic colleges, and have made beginnings with tutorial and integration programs. These bring about some correlations within given fields, and so much in itself constitutes worthwhile advances. But all of this remains merely preliminary to the real need: systematic work offered to all students so that they can have opportunity to unite the whole front of knowledge and experience at the conceptual level. Even where a start has been made there is a recognized lack of the proper techniques. Basic integrating factors are missing. Progress must be slow for fear of adding confusion and possible misconceptions to the students' already confused thinking.

Our educators must now confront one of the most difficult tasks they have ever had to perform. They themselves have discovered the problem, and they know and proclaim what has to be done. But until the *public* demands that it be done, time and resources are unlikely to be provided for the work.

We stand in imminent danger within the body social, economic, and politic unless we admit the failure the educator has discovered, and unless we support him adequately in a comprehensive program to deal with the crisis at its source. We, as individuals and communities, must confront the fact that the conceptual breakdown has already led to an ethical breakdown widely diffused through the nation, and that this ethical recession is now, before our eyes, resulting in social, economic, and political disorders. We might have, and we might even win, another war, but a lasting peace would even then not be achieved unless we can solve the problem of creating its conceptual foundation. If we solve the educational problem, we may solve all others.

Historical and Practical Considerations

Before our present public school and higher educational system came into being, we were a *frontier-coastal* colonial settlement, with local, voluntary, serviceable colleges and schools for the privileged few, as was then customary, approximately in 1650-1775. After the Revolutionary War came the conversion from a frontier-coastal colony to an *agrarian-frontier* democratic society, about 1775 to 1850. The educational needs of a democracy now slowly became apparent. Undertakings to satisfy these needs took shape during the latter years of the agrarian-frontier period. They were consciously realized and rounded out during the next social epoch (1850-1915), when the United States entered and passed through the stage of being an *industrial-agrarian* society. This means that the educational system we now have originated in a highly characterized social order.

This order has passed away. If we take the life of Horace Mann (1796-1859) as our index to the period during which the present system was being formulated, we are reminded that this time closed with the Civil War, the industrial North triumphing over the agrarian South, democratic process over slave-holding. The present school system was shaped by the same forces which produced that War, and wherever it spread it served well the kind of society the Civil War confirmed. This continued until about 1915. Now, however, we no longer have the industrial-agrarian society which was emerging in the closing years of the lives of Mann and Lincoln. The American population today, it is true, is numerically divided about evenly between farms and cities, but we have had for some years an *urban-agrarian mass-productive* society, in which the farm tends to be more and more mechanized for mass production. Corn in Iowa is about 95% sown, cultivated, cropped, shelled, stored and moved to market by machinery.

Very little that is fundamental to the curriculum has been done to accommodate the school and college system to the real meaning of the events which have occurred in this century. The chief school changes are largely physical. Farmers' children receive an education mechanized into the centers of consolidated school districts. Urban areas have become increasingly industrialized in mass production terms. Towns of moderate size in the supposedly agrarian Middle West serve mass production in two ways: They are county seats or shopping centers for the mass-production farmer; at the same time they provide labor for branches of great industrial enterprises which have often absorbed some local manufacturer. The centers of concentration of economic power are far away. Northern Illinois, Northern Indiana and Southern Wisconsin, for example, are each parts of different *political* states, but *industrially* the governing forces are in Greater Chicago, while in terms of ultimate *economic* control (finance) the capitol of this area is not even where the capital is.

Our concern is with the education which is given to children crowded unmercifully into city schools, and to the sons and daughters of the farmers hauled to and fro in crowded buses. This education continues to lag

in matters that count. Money is spent fairly generously on buildings, and the bonds are handsomely supported; the nationwide underpayment of teachers and the understaffing of schools are at last getting some attention; the devotion of teachers and parents has been admirable. But the end of this system is in sight. Teachers training colleges are 20% under-attended by prospective educators, though crowded with GIs seeking general education wherever they can get it.

Innumerable minor adjustments have been made to suit changing needs. Courses can be had in high-speed highway engineering, abstract painting, constitutional history, case law, accountancy. Nevertheless, in regard to the main and central purpose of education in a democracy, the tax-free, fee-free, universal, compulsory educational system of the industrial-agrarian age, supplemented by private schools, colleges and endowed universities, continues to fit students for a form of society that has passed away. It does not, and cannot, provide a clear conception of what constitutes the general welfare in contemporary society. How can the young citizen later express in electoral terms something he has not been taught and does not know?

The general welfare is a concept into which enters a variety of elements from art, philosophy, religion and science. Under an odious materialism, for example, welfare might be largely a matter of physical security and pleasures, ugliness could be overlooked, and virtue cynically depreciated. If, instead, the standard were a religious fanaticism, welfare might exclude even physical well-being from primary importance. Politically our government is expected to express the needs and purposes of the good life. A democratic government is, however, geared to reflect the wishes of the people. If the electorate is confused or uncertain as to basic values, no action is taken. It is the duty of the educator to do his part in equipping the student with the knowledge and insight necessary for a successful democratic society. When welfare was largely determined locally, a simple schooling could convert local experience into general terms. Now that the general welfare is determined and influenced by vast and often remote factors, a conceptual education is indispensable.

A New Attack Upon the Problem

It is the purpose of this presentation not only to re-emphasize the need for a revised approach to the education of our citizens, but also to sketch a technique that is already available.

From 1940 to 1944, while the several conferences and colleges above referred to considered some phases of this problem, a small group of associates of *MAIN CURRENTS IN MODERN THOUGHT* pursued discussions and undertook work along fresh lines.

These lines made a break with the past, in a specific way. It was concluded that it would be more effective to assemble basic philosophical materials which the student should see, understand and mold conceptually himself. The reasons for this policy are several. First, the new materials for philosophy are numerous and revo-

lutionary in their effect, and arise from intellectual events of the greatest importance. Second, it will be a considerable time before professional philosophers come to any consensus of opinion (to say nothing of agreement) as to the meanings and proportions to be derived from these events, meanwhile leaving the students in conceptual darkness, and open to the risk that further new developments will again outmode the philosophers at any time. Third, a very certain result of some of the developments, such as Gestalt psychology, genetic studies, field physics, is that we now are sure that some appreciation of the whole has to be gained if any part is to be understood. The rising generation, it was held, can make its own common discourse across departments of knowledge, if it is put in possession of the data and laws and principles which stretch from end to end of educational subject-matter. What is required is a new natural history couched in terms of universals, and so presented as to break down the barriers of departmental learning.

To such ends, this group conducted itself as a small and experimental continuing secretariat. Could the recent gains in thought, from electronics in the 1890's to Relativity in the 1900's and quantum mechanics in the 1920's be shown to have a relation to the principles of art, the universals of philosophy, the truths of comparative religion?

The work was not only a sustained and step-by-step study of principles. It was guided by a thought which has doubtless occurred to others, but had hitherto not been tried out: Why should we not seek the educational solution for the social complex in the very sources from which arise those same social-industrial-economic changes?

The disproportionate effect of science and technology is a powerful cause of recent social change. We had, then, but to interrogate the new developments in science with a view to giving them, in the curriculum, a proper and proportional relation to art, philosophy and religion, and we would be looking into the social complex with new and perhaps adequate insight. We could then ask whether, and how, freedom could be strengthened in this country by an educational system using such a synthesis. We undertook to gather together the actual materials for a course in visual and verbal study which, though necessarily conceived at the university level, could be applied at high school age.

In 1944 we had opportunity to test portions of this material at Knox College. Although our study program was only partially developed, its useful effect upon reorganization there has been generously recognized by Dr. Carter Davidson, then President of Knox College (now of Union College). Since even in the initial stages the usefulness of our proposals could be perceived by socially active educators, it seemed evident to us that we had something of national value to offer. We concentrated as far as possible in 1945 and 1946 on perfecting the actual course of the study and the elucidation of the principles, while visiting various campuses and cities to keep informed of any related efforts.

The study in concepts, derived directly from instructional material, is now at a point of development where it can have a place, with proper adaptation to the curriculum into which it is to be fitted, in any college, university or secondary school system where the need to do such work is actively felt. A full description of what has been accomplished would necessarily be very lengthy, for the approach is novel and the scope immense. It is inevitable that in the period of time applied to this problem and with the participation of only a limited group of educators we can assert only a good beginning, but the doors to a definite technique have been found to be opening. What is required is acceptance of this challenge by an ever-growing group of institutions and the development of the technique under the test and disciplines of applied education. There is attached a brief outline designed to give an indication of the technique developed to date. Before consideration of this outline, certain further explanatory observations may be necessary.

Events in the last fifty years of scientific development have made most European philosophy from Aristotle to Einstein ready for a re-evaluation in every aspect. To see this we have only to consider the fact that no one can today seriously propose to examine the activities of nature and of man conjoined in a rational universe in terms of space and time separately, but only in terms of space-time properties. As this metric conjunction was formerly unknown, in that degree European speculation was invalid and new beginnings are required.

The synthesis and wholeness so urgently required by higher educational agencies must resolve such fundamentals and hundreds of secondary developments—not all in science, of course. We have found that if we confront this complex, and use it in an atmosphere of respect for the insight of seers, sages, great religious figures, persons of acute intuitive and aesthetic perception, principles required for integration can be directly derived. Conceptual short-cuts from department to department of campus instruction are thus achieved in one course of study. The student is at the center, looking outward.

Further, he gains knowledge (and this is the core of the matter) of what is literally a sublime order authenticated by science. He acquires a notion of the universality of law, not merely as dependability of statistical description, but as an harmonic process and matrix for events. Even in science not enough is known of the extent to which this can be simply and immediately documented, hence the collection of instructional material and bibliography has been prepared in support.

It has been assumed throughout this work that education should heighten interest in learning, by showing the bearing it has upon a philosophy of life. It is held that ethical values can be strengthened if the total reinforcement of all aspects of the curriculum be brought into play. In this way the student's mental life will be geared to that of his emotions, restoring balance and integrity. In short, intellectual integration is seen as a step required in achieving an essential integrity, which includes adequate social and personal orientation.

To reduce labor, every variety of visual and other instructional aid has been called upon. Visual treatment makes the most difficult and far-off data immediately available, and shortens time while increasing vividness. We aim to take a load off the syllabus of general science as well as from specialized physics, chemistry and biology, and assist teachers of art, literature, social and other arts and sciences by framing the principles of their study significantly in the same conceptual structure as all other study. The student is thereby enabled to reveal or to discover for himself his true interests in specialization, particularly in institutions where adequate collateral personality, motivation, and ability tests are available. This central operation frees more time for the acquirement of skills.

A point of utmost importance has to be made. We are embarking on an American synthesis, contributing to a true American culture and way of life in a world milieu. In its fullness such an achievement is for the future, and since we are not suggesting that we shall do more than make a beginning, anyone participating in this work must not only assume a hopeful and inquiring attitude, but must also keep his analytic faculties at work. For he will himself have to make contributions to the general fund of data and proportions. This applies to the student as well as faculty participant. In short, we believe we have the means and materials to make an historical turning. If we have, then it is bound to demand both special and united effort. There is no such thing as calling in some supposed expert in this case. Americans have to get to work together on this task. We believe we can help to make out of that beginning a sound and clearly defined task, and that a method is at hand to enrich the mind in the manner and for the ends required. Of course there will be problems. Democratic process is the way of dealing with them as they appear.

A practical effect of such study is its ethical significance. Much of the declining moral force of American life is derived from religious and ethical family tradition. It descends from a time and a source in which the personal element was powerful. A concept of God as Person was central to a world in which the laborer personally disposed of his work hours, and the manufacturer personally owned his place of business, the father personally headed a household, charity was personal, and so on. Today we have impersonal and often absentee ownership of business, union disposal of labor, and many other impersonalizations in a new form of society. If the reality of God as Law, based on broad rational grounds, be afforded the student, the dwindling force of ethical judgments derived from older sources cannot but be re-enforced.

The course of study which presents this material will now be described in heavily compacted form. As said above, no adequate idea can be conveyed in words, for its chief feature is the employment of hundreds of visual items to give the student direct experience (as far as possible) of the exemplifications of the laws he is examining. It will be noted that every department of learning is laid under tribute for the material. The proposal is that every department shall in return benefit

from the existence of this course, and place upon it the conceptual load, strengthening these concepts by the usual detailed authoritative studies provided in courses of specialization.

The more important aspects of the study will presently appear in book form, and may be used for reference or text. This is heavily illustrated, yet is but introductory to the extensive bibliography, and the descriptions of the additional visual items. The work is constantly expanding. Motion pictures and other aids are included. The eventual development should be a four-year required course, in which the main emphasis is on *general* education, conceptually integrated by the student, during the first two years, and on *liberal* education, including social and political applications, similarly unified, in later years. The course is constructed to serve all departments as important preparation for art, philosophy, science and religion, as specialties, and for healthy domestic and community living in a global peaceful society.

PART II

Reservations

The following identification of the argument employs only one of the reasons for a shift of emphasis from the customary work in philosophy (study of logic, history of schools, categories, method, etc.) to other procedures. The latter in any case are practical choices, and are not advanced to supplant philosophy in general.

Even as to this one principle we must be brief. It is manifestly impossible to discuss usefully, in a few words and without illustrations, the larger significance of space-time, non-Euclidean geometries, homoloidal properties, quanta, etc. With adequate visual aids these can be made available and appreciable. Archibald Henderson, for example, has contrived for us an explication of the Special Theory of Relativity in one group of curves; but it would be merely befuddling to print it here, by itself, even if we had room for it. (It may be found in MAIN CURRENTS, November, 1942).

The new material, factual and philosophic, devised in accord with and by the help of the present procedure out of standard sources of knowledge, such as Shakespeare, is also omitted. The systematized bibliography has likewise to be entirely passed over, because parts of it would be merely misleading, but preliminary reading is later discussed. The visual documentation is here severely restricted to about ten items out of the thousand which are important to the documentation.

Such a reduction can scarcely be called a syllabus, and there may be some doubts as to its usefulness. Brief statements wrenched from the supporting context may sound dogmatic, outmoded, or positively erroneous, to readers without adequate equipment. Or, for those fitted to follow this brief argument, what we say here may seem to be appropriate for graduate study only. Despite all these handicaps, the following remarks may suggest to some readers the realism, the durability, and the

comprehensiveness for which we have striven in the full study. With these reservations, we now embark upon the single line of reasoning selected for present use.

A Selected Principle

Throughout the history of classical and modern physics and the whole history of mathematics, it has been established practice to seek and to find constancy and order by shifting from the dimensional limitations of immediate description to another dimension, usually higher.

For example (Figure 1) the rectilinear sides of right triangles may bear an infinite number of proportionate relations to each other and to their hypotenuse, but the sum of their *squares* is invariably equal to the third square. Thus out of infinite variability is evoked absolute constancy, by appeal to a higher dimension. At the same time, it may be remarked, we are put in a position to perceive the conceptual significance of simple harmonic motion (A, B and C on the accompanying illustration) as a function of con-

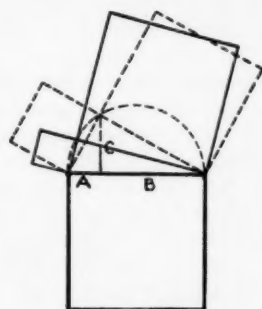


Figure 1

stancy, and thus both order and absolutes are brought under view.

Such reasoning enables us to describe natural phenomena of great importance as well. For instance, Newton's gravitational law provides that all bodies attract each other with a force proportional to the product of their masses and inversely as the *square* of their distances apart; Kepler showed that the radius vector (*a line*) of a planet sweeps out equal areas (*a surface* or *two-dimensional* quantity) in equal times; and that the *cubes* of the mean distances of the planets from the sun are proportional to the *squares* of their times of revolution about the sun.

Even thus revealed in widely extended features of the universe, these instances, which run up to many hundreds, were formerly sometimes regarded as largely practical or descriptive operations. We cannot deal here appropriately with this attitude, which may have been not entirely unreasonable formerly. It involves concepts of the relation of the human mind to Nature's processes, and much else in the realm of psychology, philosophy, and related subject matter. In any case such a discussion is today less germane than formerly, because circumstances have arisen which challenge the interpretation referred to. Such developments as Relativity, quantum mechanics, genetics, Gestalt psychology, have elevated to cosmological and metaphysical place this fundamental practice of seeking constancy and order, both static and harmonic.

This was effected in one stroke: By introducing a

four-dimensional space-time concept Minkowski has transformed these scattered instances into evidences of a new universal (ideal) to run alongside another universal, motion (both ideal and real), and the physical correlate of motion, matter and energy (real). If we care to give a confining name to the result, it may be called transcendental realism.

This is a decisive event. Yet the kind of space-time (Riemannian) so far explored with some success in these subjects has proved inadequate to bring together the major presumptions even of physics, as we see from the fact that no field theory is yet available for gravity and electromagnetism.

For our purposes that kind of space-time is even less adequate, but the principle is a major premise for us. It may be stated: Order and constancy undetected at a certain dimensional level may be located in another, usually higher, dimension.

These developments do more than sweep together and elevate to a very high place of pre-eminence in a higher-space domain a vast array of harmonic and symmetrical phenomena in science. They make possible unitary treatment of art with science, and (when extended appropriately and by sound method) they make it possible to incorporate what counts most in religion and philosophy into this whole. Simple harmonic motion, form and proportion in art, the place of law as order in society, and the like, get a new and more intense importance, and display new bearings on the nature of man, his relation to the universe, and the true and proper form of society. For in current space-time-Nature studies we have no weak "argument from design." The pragmatic force of these developments is a significant and conspicuous feature in most cases, and this pragmatic sanction provides the power which compels us to make a beginning with new ideas and attitudes.

Without being bound down to the geometric restrictions of contemporary physics, we ask in the studies here being described: What will transpire if we accept the existence of Euclidean and non-Euclidean, real and quasi-real space-time, and even space-times, and then examine all forms in physics-chemistry, biology, psychology, and sociology, and all cycles in astronomy, atomicity, geology, history, biology, and other subjects, in terms of the properties of such opulent space-times? Some of these properties are described in available standard works, and H. M. S. Coxeter has announced the early publication of a definitive work upon some of them at the four-dimensional level, where they are of highest significance for our immediate purposes. We think here, however, of much more, and recall a remark reported by a friend of A. N. Whitehead, to the effect that he expects a time to come when every mathematical notion man has had will be found exemplified in Nature.

The procedure amounts to evolving a new natural history and even natural theology, derived from all subject matter, ancient and modern, Eastern and Western, subjective and objective. It includes not merely small parts, but the whole of kinetics and statics, and all

that is known of dynamics. It also faces up to biological data, and to the special significance of creative man. The results are rich beyond all hope of brief description, as we have said, but the following specimens from the course of reasoning may have meaning here.

The Course of the Argument

Looking at the whole of natural and human activity in the light of the foregoing and of many other considerations, and considering the phenomenal universe to be a going concern under whose external processes is another, deeper, and essentially harmonious noumenon, all existences can be reinterpreted and re-evaluated in terms both dynamic and evolutionary, as well as terms static. We refer here only to the latter because they are easier to elucidate, but we may first make some general observations about the framework common to all aspects of the immediate terrestrial cosmos.

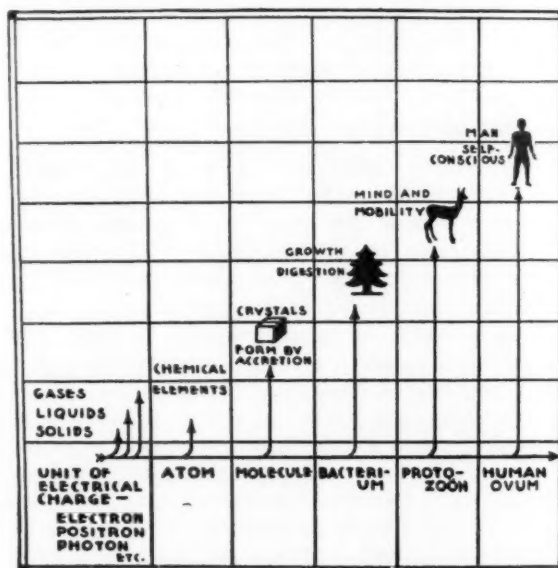


Figure 2

Conceived in present terms, the hierarchy of living and non-living forms may be laid out as in the accompanying scheme, Figure 2. In this, provision is made for all the inter-gradations between kingdoms, though of course not shown here, and also for the striking dissimilarities at the crest of each major evolutionary advance. At the bottom stretches horizontally from left to right the microscopic world, a series of unitary entities and unicellular lives, with increase of sentience (intension) left to right, on the horizontal. If we conceive the vertical co-ordinate to represent increasing organization properly and invariably associated with lapse of time (evolution of organic and colonial living), we thereby associate morphological gains made with the lapse of time (extension) with increased sentience (intension), and thus we get a general view of the whole of nature, starting at the lower left with those atoms, zeros, and privations at the root of material structures, and pass over and upward, to that *tertium quid* so evi-

dent in human activity, creative and spiritual resource. Thus energy, life, and consciousness are put before the student in a single paradigm, useful for later expansion and hence good for a long course of thought.

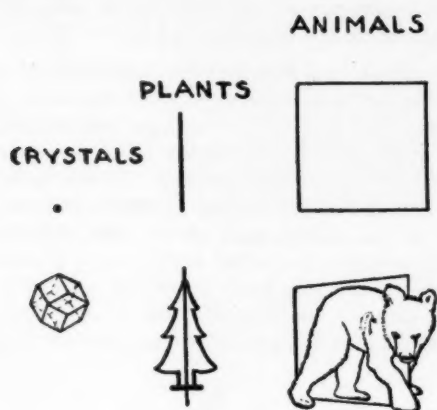


Figure 3

Associated with this way of arranging the hierarchy of creatures is a singular geometrical fact displayed in Figure 3. On the whole, the crystal kingdom tends to be centro-symmetrical, the plant kingdom linear in symmetries, the animal and especially higher animal forms, bilaterally symmetrical. The arresting fact that man is *not* bilaterally symmetrical can, in these terms, be given deep-reaching meaning. We do not interpolate this difficult subject here. (See MAIN CURRENTS, July, 1943), but we may note closely that the planar centro-symmetries of crystals can be represented by one

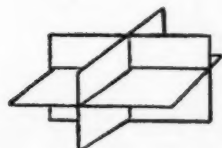


Figure 4

interception of three space-planes, Figure 4.

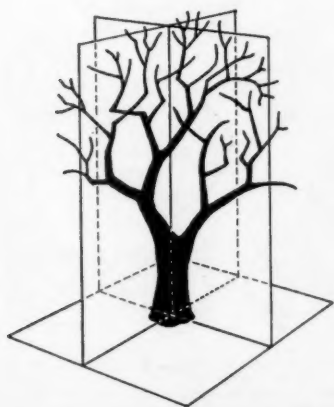


Figure 5

A major difference between the crystal kingdom and that of the plants is that the latter forms *grow* whereas the former merely *accrete*. And as a result of growth, or consonant with growth, is the abandonment of centro-symmetries in plants and the featuring of linear symmetries. It will be seen from the tree in Figure 5 that two space-planes provide the axis required, but we must imagine a third time-lamination (impossible to represent, of course) to allow for the features of the growth.

Similarly, when we pass to animals, and especially the most significant of animals in higher ranks, symmetry of form is over a plane, and this change is accompanied by a change in the time-relation. For these higher animals grow (which implies one time lamination) and they also engage in purposeful mobility. This is another kind of motion, additional to growth. So a second time-lamination must be imagined. We show in Figure 6, the elephant treated bilaterally. See also the bear in Figure 3.

It should now be clear that space-time geometry has as much meaning for morphology and for function in biology as it has for properties and energy levels in physics and chemistry. This subject we document in all its ramifications.

We believe we have, by these means, educed a technique with which to make a start in the study of the properties of time, through examining growth, purposeful mobility, and duration (memory and anticipation in man) and much more, as time-variants displayed primarily in plants, animals and mankind.

Continuing on the main line of reasoning, we are attracted by a fully-established body of knowledge. The crystal kingdom forms a domain which lies on the border with physics-chemistry on one side and biology on the other. As today understood, the crystal state is much more comprehensive than most general readers know, and its significance to life is now very great indeed. In fact, the living cell is today often regarded as an aperiodic crystal. For our purposes we note that in this vast block of natural geometric forms of true

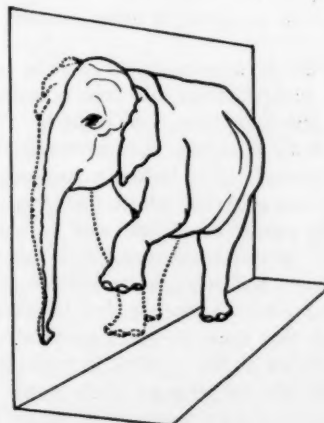


Figure 6

crystals an almost unbelievable reduction of systems is possible. There are between 30,000 and 40,000 crystal forms known to mineralogy; and millions of additional forms can be artificially prepared, for every specific chemical substance which crystallizes does so only in a form peculiar to itself. Yet these thousands and millions are reducible by steps to classes, each containing more species, first 230, then 32, then seven, those to three, and finally to one singular convex polyhedron, the tetrahedron. In order to display the magnificence of this order, we supply a few items, expanding the series out from the tetrahedron to the cube and octahedron, and so to a few of the more easily appreciated differentiations, Figures 7, 8, and 9.

We thus arrive at the following proposition, novel to minds so long accustomed to statistical studies, averages of random events, and the like, and so little used to what is now emerging from science: We observe that the space-time potential, which is here our main theme, provides other regular convex polyhedra, polygons, and related polytopes, additional to the cube and octahedron and the tetrahedron. The total resources of the geometry of space-time in question (and here used) have not yet been determined by methods of mathematical exhaustion, but on the positive side it is established that we have a group of figures connected with the dodecahedron and icosahedron, which are mutually reciprocal, as are the cube and octahedron. There is a third group, which has to be examined in its four-dimensional (polytope) aspect if we are to see the full plenitude of its regularity. (This can be done in the classroom by using quite simple three-dimensional models). And finally, additional to those three groups, there are all the splendors and harmonies of circular, spherical, and hyperspherical figures. Upon this basis of four groups (geometrical matrices) we may state a theorem of great importance which has been documented as fully as may be with present resources: *These four groups may be applied to the forms and classification of the crystal, plant, animal, and human kingdoms, and hence energy, life, and consciousness.* Thus for contemporary thought is suggested a way of running the lines of the harmonic order throughout all nature, into human affairs, as a universal, to which we give the name *general morphology*.

It is obviously impossible to discuss more of this prodigious generalization on this occasion, or show where and how mind and soul come in. We can only say that in static terms the documentation is sufficiently striking and simple to be looked at and measurably understood by any observer with a good high school education, under proper conditions, and by seniors in high school under special conditions. Nor can we pause to show how sages and seers, poets and prophets have experienced the order we propose shall be studied. But we must remark that these pioneers speak about this with one voice. If we in the Judaic-Christian-Islamic tradition say that the heavens of ideal beauty declare the glory of God and the firmament of matter sheweth his handiwork in periodic tables, in the Bode-Miller and

other Laws, no less do we find that the Hindu-Buddhist-Taoist world has long since maintained that there is a matrix not primarily luminiferous but sonorous and harmonic, precisely described as the Akasha of the Nyaya-Vaisheshika. It is indeed no other than the "aesthetic continuum," as Northrop so admirably denominates it in *The Meeting of East and West*.

The studies lead directly from individual forms and taxonomy and classification (on which they have powerful specialized bearing) to ecology and biomes, and hence, at the human level, to the form proper and inevitable in a free, mass-production, organic society, an orderly American way of life. In that transition, from nature to man, appear some of the most obdurate and slippery problems connected with getting a consensus of opinion about what really is the full range of human nature, such as conscious and unconscious, body and mind, soul and spirit, selfishness and altruism. But they

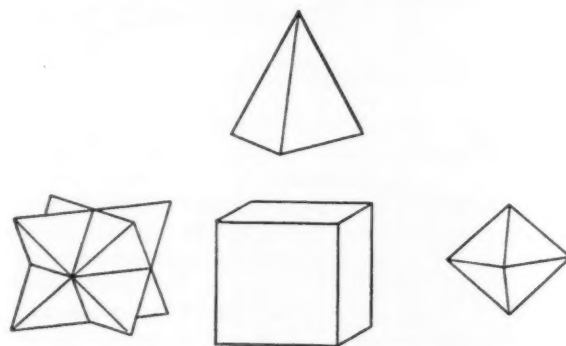


Figure 7

Above, the regular convex tetrahedron. Left, two of the these rectangularly intercepted. By connecting the vertices, the cube is derived. By snubbing off the points, the octahedron is derived. Thus any forms derived from cube and octahedron eventually refer back to the tetrahedron.

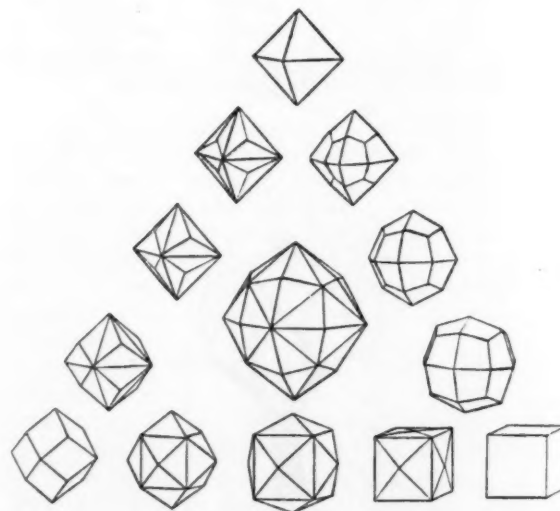


Figure 8

The octahedron, at top, and the cube, at lower right, give rise to the limiting forms of the isometric holohedra. The observer needs no mathematics to follow this transformation. (From *Elements of Crystallography*, G. H. Williams, Holt, N. Y., 1892).

appear in a new light, and certainly for education it is high time we arrived at a working agreement as to the nature of man. That agreement is not impossible in a framework of a grand systematics which rests upon an adequate and valued general morphology. History, archaeology, anthropology; geography, geology, astronomy; geometry, algebra, and their intermediates; logic, symbolics, harmonics; physics, biology, psychology—no topic is too large or too specialized to escape simple or extended reference or to be laid under tribute for conceptual gains, to the end that the student shall see not only life, but energy and consciousness, whole and harmonious, and discover for himself his place in the scheme of things.

It is important not to conclude without reference to the social studies natural to the pursuits proposed.

Many sociologists have seen the need for some method of arriving at general agreement as to the actual operative form of society, especially modern society, so that functions may be clearly defined, and the place of individuals and institutions be equally certainly determined.

In this matter two lacunae have long been apparent. One of them may be referred to in the words of R.R. Marett, Rector of Exeter College, Oxford University: "... society . . . will inevitably have a structure, just as if it were really and not metaphorically a body; . . . there will be functions corresponding to the structure

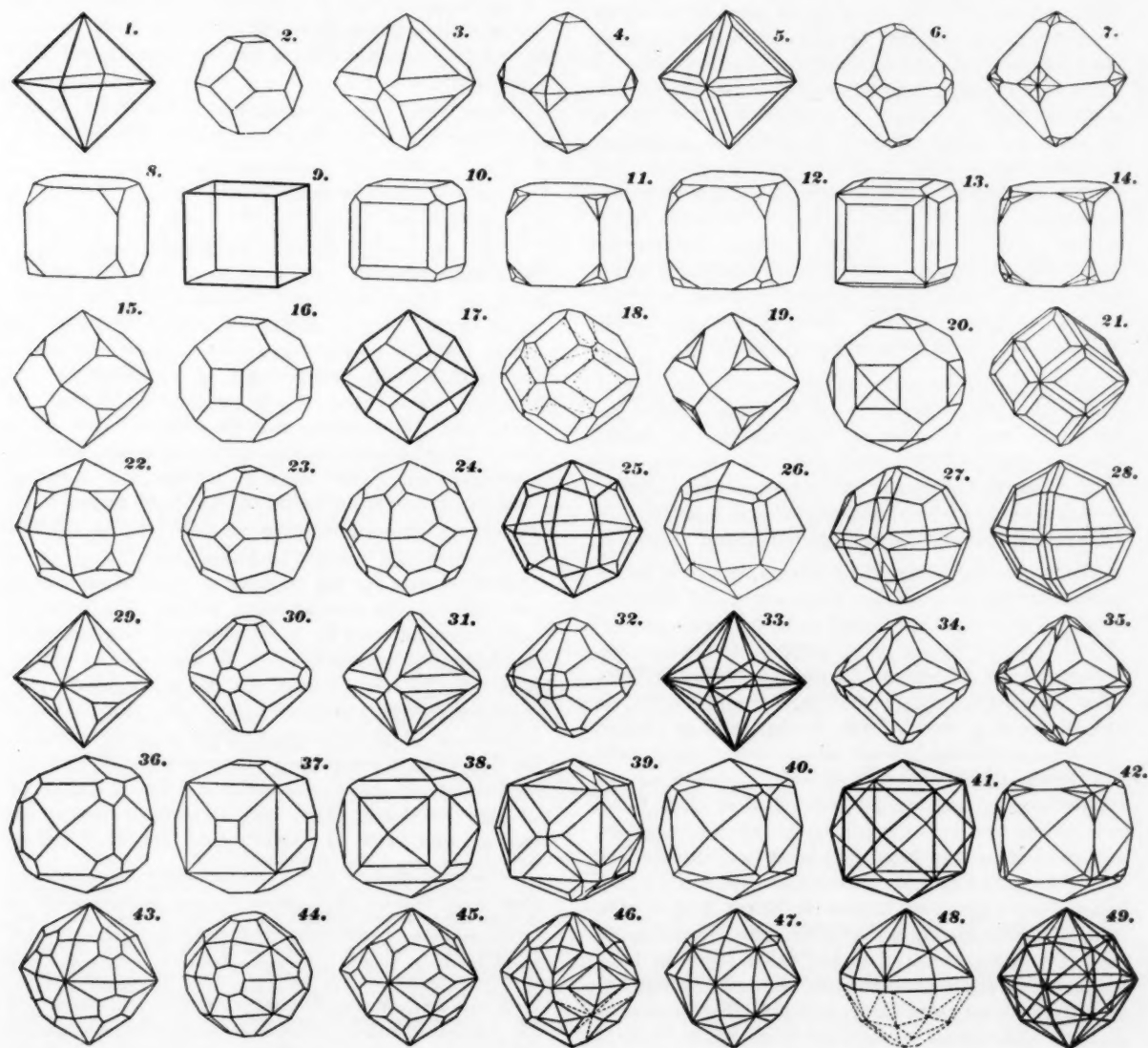


FIGURE 9

The polyhedra in the preceding Figure (8) will now be found distributed down the diagonal of the above group, and out from them are specialized (by snubbing, etc.) further isometric combinations. These three figures 7, 8, and 9, constitute a display of some of the simpler crystal geometries. (The student should note that the perfectly regular convex dodecahedron does not occur in the crystal kingdom). All forms are referred back to the regular convex tetrahedron by way of cube and octahedron, in terms of the four-dimensional polytopes of these forms, not their simple three-dimensional (polyhedral) variety. Because of this four-dimensional latitude, the variety of forms derivable from so simple a beginning is bewildering, and the resemblance to the tetrahedron may be completely lost to view. (The above plate from Ulrich's *Krystallographische Figurentafeln*, Hannover, 1884, reproduced in Williams *op. cit.*)

... In terms of such a morphology and physiology of the body politic, we could stop short at describing all the outward manifestations of ... social life."* Thus he defines one of the known and unsatisfied needs of the sociologist. Lundberg's work points to this gap in knowledge, and one of his pupils has made an effort to fill it.**

To describe the other need we pick up and extend our quotation from Dr. Marett. Continuing after his remarks about social morphology, he says: "... describing all the outward manifestations of ... social life ... would be as if one were to visit a foreign country without knowing a word of the language, and were nevertheless to draw up a description of the visible behaviour of the people. Yet clearly such an account would be very imperfect. Another traveller, who was at home with the language, would double or rather treble its value by supplying the motive—the more or less conscious why and wherefore—of everything that was done. In short, a Social Psychology is needed to supplement the mere surface view of life of any given people. For Man is not only the social animal but the self-determining animal above all others. The ultimate clues to his actions must be sought within himself, whatever the behaviourist may say. Indeed, a behaviourist philosophy which would explain life exclusively in terms of matter and motion is either physical science gone mad, or, more probably, it is sheer narrowness of education."

Here, then, is the challenge: Sociology must be both morphologically correct and explicit and in some degree mensural, and it must be functionally meaningful. For our purposes that form and that meaning must have exact and adequate reference to contemporary America in a neighborhood world, and must serve a future American culture in a peaceful global society.

From what we have said up to now, it should be apparent that any social studies done in terms of the properties of space-time are bound to be not only morphological, but even metric. Such precisely is the outcome, the vectors and the tensors, the forms and the functions, of a freemen's, mass-production, organic society, in axiomatic and geometric form. In that form an obvious relation is confirmed between education and philosophy, and between government and religion taken as the brotherhood of man and the fatherhood of God. But a new and no less inevitable kinship is found between art and production, and between science and distribution. This puts us in a position to define, at last, social equity in a modern society, and to pass on the practical steps to implement both equity and ethics. This is possible because the organic form of society has a place for body and mind, no less a place for soul and spirit, defined as adequately as any other factor or tissue. The economics of such a structural society are quite naturally indicated. Already determined by trial and error conjoined with intuition, some of the required principles for the economy have been called into use in American indus-

try.* To encourage their extension, and their use for the general welfare, is no mean part of the program in sociology we hope to assist in formulating.

To do this, as Dr. Marett makes clear, motive, soul, must be recognized. This is the inviolate core of being, and the level at which the diversity of primal entities in the universe appear to the individual as unified. In all religions, at many levels, in many degrees of clarity and depth, the idea is repeated that a trinity of universals are the *personae* of a unified, sublimely ordered, cosmos. By pursuing this theme from its simplest appearance in the physical world as "the beauties of earth", up to the aetherial heights to which we propose the student shall look, working always realistically in contemporary terms of space-time-nature, it is possible to perceive how the social body is informed by the intelligible soul. In such a society the citizen inheres dually, being himself both body and spirit.

Isaac Watts long ago celebrated in his *Divine Songs* the then simpler problem of the man of good will:

When'er I take my walk about,
How many poor I see!
What shall I render to my God
For all his gifts to me?

That same problem faced men of good will in another great age of confusion and transition, and the answer again is that duty is dual: "Render unto Caesar the things that are Caesar's, and unto God the things that are God's." Today's confusion as to the things that are society's (democracy having supplanted Caesar), is surely likely to continue until we come to know effectively the relations between equity and ethics, and this knowledge can hardly come to us until we ascend at least theoretically the mount of vision, by means of an education capable of directing our sight from an altitude.

Receding still further backward into the ages, we find the charter for the work some of us would like to see done for our time and our people: "He who has been instructed thus far in the things of love, and who has learned to see the beautiful in due order of succession, when he comes toward the end will suddenly perceive a nature of wondrous beauty (and this, Socrates, is the cause of all our former toils)—a nature which in the first place is everlasting, not growing and decaying, or waxing and waning; secondly, not fair in one point of view or at one place fair, at another time or in another relation or in another place foul, as if fair to

*Since writing the above we come upon the following passage, including the footnotes, in *The Social Problems of an Industrial Civilization*, by Elton Mayo, Professor of Industrial Research, Graduate School of Business Administration, Harvard, 1946, page 34:

"For nearly two centuries economic study has been supposed to provide the social skills requisite for the effective handling of civilized human activities. And in some areas its more concrete studies have unquestionably fulfilled this demand. For example, questions of cost accounting, marketing, and the large-scale organization of industry in its formal aspect have been handled with considerable and growing skill. But in these affairs there has developed economic practice of a valuable kind far removed from classic economic theory. E. H. Carr has said that in recent years the 'chronic divorce' between economic theory and practice has become more marked than ever.¹ And he pictures economic theory 'limping bewildered and protesting' in the train of economic practice. Chester Barnard, himself an executive of great experience, finds that effective leadership in industry, that is, successful administration, 'has to be based on intuitions that are correct, notwithstanding doctrines that deny their correctness.'²"

¹Edward Hallett Carr, *Conditions of Peace* (New York, The Macmillan Company, 1942), p. 79. ²Chester I. Barnard, *The Functions of the Executive*, Preface, p. xi.

*We quote from his words in *An Introduction to Social Anthropology*, Grosset and Dunlap, New York, 1931.

***Dimensions of Society*, Stuart Dodd, Macmillan, 1944.

some and foul to others, or in the likeness of a face or hands or any other part of the bodily frame, or in any form of speech or knowledge, or existing in any other being, as for example, in an animal, or in heaven, or in earth, or in any other place; but beauty absolute, separate, simple, and everlasting, which without diminution and without increase, or any change, is imparted to the ever-growing and perishing beauties of all other things. He who from these ascending under the influence of true love, begins to perceive that beauty, is not far from the end. And the true order of going, or being led by another, to the things of love, is to begin from the beauties of earth and mount up for the sake of

that other beauty, using these as steps only But what if men had eyes to see the true beauty—the divine beauty, I mean, pure and clear and unalloyed, not clogged with the pollutions of mortality and all the colours and vanities of human life—thither looking, and holding converse with the true beauty simple and divine? Remember how in that communion only, beholding beauty with the eye of the mind, he will be enabled to bring forth, not images of beauty, but realities (for he has hold not of an image but of reality), and bringing forth and nourishing true virtue to become the friend of God and be immortal, if mortal man may. Would that be an ignoble life?"

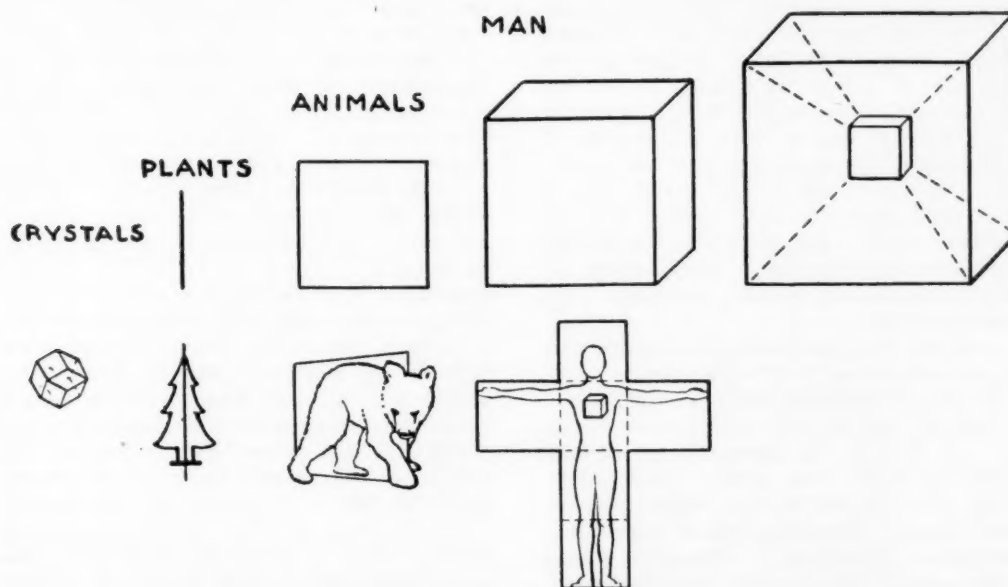


Figure 10

The above symmetry series is merely Figure 3 extended, and is not to be taken as fanciful symbolism, though it has conceptual bearing on art, philosophy, religion, and science. We are interested in realism and not in what Jung well calls the mysticism of numbers. It is in Nature that we observe the series point, line, plane as centrosymmetry, linear symmetry, and bilateral symmetry. We observe that the series is interrupted here, for the human face and form are bilaterally asymmetrical. The logic of the sequence is that human growth has reference not to a plane, but unsymmetrically to a regular solid or regular hyper-solid. If we employ the analogue of the square, then that solid is a cube. In point of fact, human bodily proportions can be shown to draw upon a great variety of polyhedral frames. If so, then appropriate postures should reveal appropriate proportions, and indeed the human reach is the same as the height, on the average, when disposed in the flat. We merely summarize this and a host of data on human morphology by a single human figure, placed in an unfolded cube. The final object, on the right, is a correct model of a hypercube, which has been given the name tesseract. The properties of a tesseract would be revealed as a growth series in nature. Discussion of this ranges far beyond our present purposes.

PART III

THE TASK IS URGENT

Asserting our faith in democracy, we have made mention of its deep-seated problems, and recognized the vital role of education in restoring health to society. We have seen that the United States confirmed democracy by establishing tax-supported free education; that the curriculum has not been adapted to the mass-production age; that this failure and the precise cure are widely recognized; that nothing effective has been done formal-

A Summary and Conclusion

ly to bring about change at the center; that friends of MAIN CURRENTS have for some time been at work on several aspects of the required solution with some initial success.

The work of this group consists of the collection of data which builds up integration at the conceptual level; the collation of principles of the arts, the universals of philosophy, the values of comparative religion, and the

laws of Nature as documented by science; publication of significant matter, fragmentarily in MAIN CURRENTS, collectively in works to appear; doing the sustained and purposeful reading of basic and current matter which is required.

The educational applications assume that these principles, universals, values, and laws have to be engaged in a rational grip, even if detected first by intuition, if the concepts are to have value in the curriculum. In educating young people so that they will defend the general welfare in a democracy, reason must come competently into play. The final object of integrating subject matter is the evocation of integrity, detachment, calm, and insight, as necessary elements for honor, probity, truth. We therefore emphasize the new role of truth in science.

Until quite recently speaking of "a truth" in the sense of an absolute was offensive in some scientific circles. It would signify that there are principles at work which must be assented to although no one has ever seen an instance in Nature. In this sense we speak of the truths of religion. One might speak of himself as immortal. Obviously this would be hard to document, as more than one person would have to be about for quite a while to get the evidence. We know we change daily, bodily. Yet the sense of continuity we associate with ourselves is a universal experience. Ethics inheres in something or other which acts as if it were a permanency.

Today truth, in that sense, formerly so repugnant to science, has been restored to general esteem. A remarkable feature of Einstein's work was splitting off the ideal from the material in Newton's laws (MAIN CURRENTS, July, 1946, p. 70, column two), when he raised the basic question about belief in ideal motion of a material body in a straight line, forever. No one has ever seen a straight line, nor a body in straight line motion, and the idea of continuing on to infinity means forever. The upshot of this inquiry into absolutes has been to substitute geodesics for straight lines, but to re-establish the role of the ideal in physics even more firmly. Relativity documents the necessity for a metric structure which no one sees, except possibly in crystals after a fashion, but which is obeyed by Nature. In consequence, truth, in the sense we have been discussing it, has a standing it has not had in science for many generations. A person of sixty believes it to be true that he is the same person as he was when his body was a bright-eyed child. The physicist believes that metrical lattices betraying harmonic properties in their material expression, operate under the veil of earthly things. If, out of this remarkable rapprochement between science and religion we can derive some really good ethics and aesthetics by way of philosophical insight, something which belongs to spiritual splendor will come back to us: self-reliance.

For the loss of self-reliance is caused by much more than the concentration of economic power in a realm which is outside of the political reach of democracies. And the solution of this problem must involve more than political action. In fact it may be reasonably doubted that *political economy* is the ultimate solution. Even those who take to political action to mend economic

ills doubt the virtue of such escapes. For two or three generations we have had the astonishing spectacle of government making increasingly stern and consistently more vain efforts to do what it can in the economic domain. During this time unelected economic concentrates of power have resisted when they were not themselves going to government for legislation, subsidies, and protection. Along these lines our plight steadily worsens, and the individual who cares to be self-reliant finds more and more that his economic welfare is not in his hands. That a few may inherit financial security or power, or a few achieve it, is no answer for the many. The main social question is untouched: Is there any alternative to the constant oscillation between the pressure of society on government to protect the citizen, and the pressure of business, industry, and especially finance demanding that government's response be as small as possible?

A more active and higher ethical standard is part of the answer. Ethical drive and power come from religious faith, but this cannot be provided in channelled form through the public school system. It may be doubted whether it can be communicated at all by verbal assertion alone, since genuine religious faith is a mode of life, not a set of terms. In any case, the immense prestige of science requires us to attend to its claims on mankind's respect. It is essential, we hold, that there shall be restoration of respect for truth independent of local circumstances, if personal responsibility is to come back to the citizen. The citizen of today will come to value truth when he knows that it lies beneath the surface of things, that he is rooted in this deeper state of affairs. From science, properly interpreted, the student may discover that he can know truth, and from religion that only by knowing truth can he confirm his freedom. When it is conceded in our country that we believe in a universe of law, then only will dodging, half-truths, double-talk, trick statements, indirectness, self-abasement for physical gain, smearing, and the whole evil genera of falsehoods be understood for what they are: sickness of the soul taken from that miasma which poisons love while it clouds the spirit. That miasma is man's ignorance of his glory. If this be doubted we suggest a preliminary re-reading of that profound and today topical passage in *John* (viii, 31) wherein occurs the statement: "... the truth shall make you free", and of Shankaracharya's opening words in his *Atmanatma Viveka* (Discrimination of Spirit and Not-Spirit), which is identical with the first proclamation of Siddhartha Gautama Buddha in the *Dhammachakkapavattana Sutta* (The Setting in Motion of the Chariot Wheel of Righteousness): "Nothing is spirit which can be an object of consciousness. To one possessed of right discrimination, the spirit is the subject of knowledge."

A notable phenomenon of recent years in this country has been the growing concern of university and college presidents, professors, writers, artists, and radio program personnel with the national and international scene. There has recently appeared a simple account by Elizabeth Hawes of her experiences in the labor movement, *Hurry Up, Please! It's Time*. (Reynal & Hitchcock, New York, \$2.50). This might not be con-

sidered a serious book, but it is a serious portent coming as it does from someone with the author's background. Its content and atmosphere are most revealing as to what happens when a woman, sensitive and sincere, finally awakens to the shabbier and more violent parts of our American scene. Miss Hawes does not write hysterically, but she does communicate shock. There is no occasion for hysteria; but certainly it is time to work at the very root of our problems.

There is a very special reason, broad, historical, and sobering, for urgency. The coming of much greater leisure to all mankind is sure, here and now, or somewhere and presently. That event will progressively make mere literacy inadequate, as it has now already become a cause for ethical and economic decay. As the educated citizen grows in conceptual wealth, the coming of physical wealth, security, and leisure will be proceeding. When the latter is more fully achieved physically, the former will be at hand for spiritual strengthening. The present break-down of families,

increase of mental instability, confusion, bleakness and despair, which serve the evil purposes of personal and racial violence, can thus be arrested at the root, in the individual who today is likely to seek unworthy relief from his emptiness and boredom. The pursuit of truth once more established as the central purpose of education, leads naturally to a love of beauty, and to enjoyment of the good.

The achievement of leisure is the meaning of mass-production. The achievement of insight with which to use the leisure wisely is the meaning and purpose of an education devised in terms of concepts. Thus enriched and fortified, the general welfare is secure, because what constitutes welfare is known. We aim to show that this knowledge can be found and communicated. Is such a purpose ignoble? Does it deserve sympathetic attention? Is it high on the list of causes requiring immediate aid? Answers to these questions are the concern of persons in posts of responsibility.

F. L. Kunz

READING TOWARD CONCEPTS

The Two Materialisms

Throughout this study a distinction is maintained between two materialisms. The belief that anything which is experienced as if it were objective to consciousness, must be materially invested, is a generalization which has served physical science well, without closing off the possibility of existence to unknown energy levels. This universal includes even now one variety of effect upon the known physical world not traceable to material origins: cosmic rays. It is evident that a materialism so generous is necessary. Today we know that matter is but specialized forms of a field of energy which stretches far beyond the solid, liquid, and gaseous states, through many levels, to geometric points, anticipated in the Hindu doctrine of atoms (Sanskrit, *anu*), which constitute the veil (*Maya*) over the transcendent reality (*Brahman*).

This thinning away of the substantial to the insubstantial was perceived early in the revolution in physics. Einstein and de Sitter discussed aspects of it. Eddington attempted to abandon lines of finite length and to reduce the world to true atoms, mere points. P. A. M. Dirac has contributed to progress in this field, and as late as December 19th 1946, a further step was marked by the Mayer Award going to a research worker who studied with Dirac at Christ's College, Cambridge, Dr. Jayaratnam Eliezer, of Ceylon, for a discussion of point-particles in quantum theory. All this inquiry is on the border between the infinitely great and the infinitely small, the "greater than the great and smaller than the small" of the Upanishads and of Vedanta. It is a genuinely philosophical treatment of matter as gradations of unknown extent.

To the other notion, which also goes by the name materialism, should be applied a different term, perhaps physicalism. It lingers on among us from an out-moded

A Reasoned Bibliography

last-century science, when it would have been ridiculous to entertain the notion that a point-atom of infinite energy potential is serious physics. An educational lag has kept it alive, and large sections of our literate population oriented to popular science continues in the assumption that physical experience is the only reality, mind is but a by-product, and spirit a mere belief. Even in such circles it is coming home as truth that the universe has its real source hidden and that the physical is an end-product, in every sense, including that of astro-physics.

But there is much yet to be done. For in the mind of some who have had a so-called higher education, "an odious materialism" (in Einstein's recent phrasing) can exist close beside a fervent, sometimes intolerant, religiosity; while a narrowing-down of the generous materialism which we described above, to a mere sensationalism, may be the practical philosophy of strictly scientific minds motivated by high social and ethical purposes. The statement may be safely made that these double orientations in individuals arise from failures in the philosophy of religion. The complementary truth to a spacious and workable materialism is taught as basic doctrine in the most fundamental literature of Buddhism, Christianity, and Hinduism, as noted precisely in specific quotations in earlier MAIN CURRENTS. The religions all maintain that spirit is the subject of all objects, and is quite as important for contemplation and experience as is matter; and that the truth which is required to free us, and hence to confirm freedom in society, is that body of knowledge which is as true of subject as it is of object, of spirit as of matter. Latter day devotees of religion have a good deal lost sight of this fundamental requirement, and physicalism is the poor substitute.

The remedy for this state of affairs is a recognition that there is a rational means available to bracket subject

with object, religion to science, spirit to matter. The first step is to accept the sweeping generalization under discussion here, we believe. That is to say, if we are to make the needed conceptual gains, we must realize that the word materialism is very much larger than the term physical, that energy is far larger than material, that a monism of spirit and matter is today possible, and (for our immediate purposes) that the comprehension of an adequate materialism is but the first step out of physicalism.

The second shift of ground, from three to four, if not more, dimensions, is even more difficult than a final achievement of the energy-from-points concept, yet no less necessary, if we are to encompass all experience in one set of rational terms. The obstacles are two: habit, and mathematics. Each singly, and especially the latter, would be easy enough to deal with. Combined, they are formidable educational obstacles. During the centuries when no rational procedure was generally available, man has made his transition out of the physical by non-rational progression, through phantasy, belief, aesthetic expression and the like. It is today physical data which require us to use a four-dimensional realm as no less real than three, and the implications of a hyperphysical reality are hence acquirable by rational steps.

We are therefore now required to do by reason what we have long sought to do mainly by unreason. But the reasoning itself has been difficult to many because, up to now, it has been limited to highly technical mathematical skills. Restatement in verbal terms is progressing as new books appear, but the mathematical reasoning will always be a component, even when the *hieroglyphics* have been translated to verbalisms. Mathematical reasoning is a peculiar technique, quite mistakenly reduced to logic. *Proof* in mathematics is strict, but *progression* is by intuition (by which we do not mean simple assumption), and what we educators want now is progress. We shall make further reference, later in this reading guidance, to the relation of logical proof to intuitive progress, and here merely say that a mind habituated to physicality divorced from a heart which has sought freedom by unreasonable means, is our real problem, not the mathematics.

If we are to succeed, we must summon not logic alone, but all the resources of intelligence, which can order and use the drives of intuition without retrogression to pathetic beliefs. The only steps appropriate to education are ultimately rational, each clearly understood. We have to take this step from three to four dimensions, from physical to hyperphysical, by means formulated by physics, in itself as of today no task for toddlers. But let us not make it needlessly difficult with extraneous elements, but consider only imperatives.

First, there is no escape from our duty to go ahead, it being forced upon us by physics itself.

Second, let us have no encysting of habitual beliefs away from the freshening circulatory system of learning, for fear they may prove to be erroneous. Whatever is true in mankind's achievements through aesthetic, philosophical, or religious means is not endangered. Truth is never menaced but only supported by more truth.

Third, to the opposite party: surely we would be foolish to resist all the implications of the new freedom because its gains have hitherto been anticipated by non-rational or illiterate process? Man has breathed all through history, though his theories of the process have been poor. His theories of spirit may be ridiculous, but he may be engaging in exchanges with the cosmos at that level, all the same. Columbus was correct in believing the world to be round. Today the people who do not accept the reality of the hyper-sphere are flat-earthers. The sally which has lately been successfully made by the theorists into the hyper-sphere proves them right about the new and larger roundness of things, but it does not prove the flat-earthers wrong about the existence of India. They may merely have India wrongly located, next door. Beyond the tumultuous Atlantic of nineteenth century randomness Einstein has discovered a bare continent, inhabited sparsely by those simple, stoic savages, hitherto unknown facts. Beyond this wilderness there may be yet another and more pacific ocean, and then continents populated by civilized souls. Thus these well-reasoned voyages to the West may, if pushed home, bring us round to the places reported rudely from earlier journeys to the East. Man is in touch with Nature in manifold ways, not narrowly by logic alone, however good that pedestrian infantryman is in consolidating gains.

Practical Aspects

We are herein re-organizing reading in reference to mind at work in four dimensions, yet not regarding that generous enlargement as the end of the resources of Nature or of human high-level psychology. Further, we propose to show from the sources that no proper knowledge of these higher domains can be gained by presuming them to be less charged with life and worth and meaning than the physical. We propose not only to study the physical shadows on the walls of Plato's cave, but to turn round and see the Forms which cast them, and study the source of the light, as a preliminary to casting off chains and exploring the free worlds about us and behind us. Reason is to be our guide, not our gaoler.

Much of the source material for this long-range program in reading is technically difficult and mathematically advanced. In our case the common good cannot be served by popularization, for the kind of simplification we look for in the future is not to be achieved by a levelling of the hills to a plain, but by an ascent to the heights. We therefore list here, first, works of prime authority, choosing where available those relatively full in verbal exposition and bristling as little with mathematics as possible. Second, we offer some guidance here and now as to how to interpret the contents of books recommended, in the larger context. Third, we intend to discuss these topics conceptually in MAIN CURRENTS, from time to time and in book form, and we invite such discussion. Fourth, we add references to popularizations by experts in each group of topics.

The expert, particularly in physics, writes in a very special atmosphere, conditioned in two ways: He may be describing end-results—that is, physical phenomena

—which are hyper-physical and not physical in origin, and hence charged with important meaning for conduct. Yet his work involves a transfer through terms which reduce the superphysical reality to fleshless mathematical skeletons. For cosmology this may be all very well, but for earthly efforts toward the good life it lacks something. It is difficult to feel warmed and encouraged by an embrace of bones even in nice mathematical arrangement. Second, until quite recently the expert wrote of new gains in terms of reference physically confined, and from these terms the general reader was likely to mislead himself. Our deliverance is therefore to be sought in the source-data, not in popularizations, unless they be accurate abstracts in which the mathematical progress is given verbal meaning. There is not yet enough of this available, but we include what we have.

In the circumstances it is surely best to commence one's re-education boldly by understanding how the actual delivery of our minds was most fundamentally brought about, namely, in the three aspects of science, commencing with critical events in physics. The reading essential for that first and most important of liberating movements is justified and listed a few paragraphs forward, after we introduce the sections devoted to reading in the sciences by a brief identification of the main theme.

Such identification is needed, since what we here attempt is intended as help for the general reader as well as for faculty members acting upon committees on integration of improvised curricular revision. We all require as much help as we can get, but the reader not equipped with philosophy has a special problem: He has to bring himself up to date in nearly every field of general information, because integration implies some notion of the whole of knowledge and all forms of experience. The philosopher may have the special impediment of dependence upon speculation, but he has as compensation constant familiarity with generalizations, even if those he uses appear today less effective than before. For him the reading sequence we adopt here should be best, as it commences with the data which head us directly out of the old limitations. For others the beginning might be made with item six, before taking up one to eight in the following systematic collection of sources.

1. Authoritative accounts of critical intellectual and scientific recent events, especially in physics, biology, and psychology. 2. Comparable records of equally critical social, economic, and historic events. 3. Provocative and competent discussions which estimate philosophically the revolutionary meaning of various portions of the first two topics. 4. Studies of new fields which the critical events brought into being. 5. Analyses of past philosophical efforts re-considered in the light of the intellectual and social revolution. 6. Reviews of special subjects by contemporary authorities who reached maturity before the recent changes, who can best bring us up to date and testify to the sweeping import of new events. 7. Studies in the principles of the arts, and 8. the truths of comparative religion, assuming that the laws of science and the universals of philosophy have been dealt with in the earlier reading.

In this issue of MAIN CURRENTS we have room only for bibliographic notes on a small part of the first, and a few on the seventh, and eighth items. The present suggestions for reading are intended as specimens with which to make a beginning, and the arrangement anticipates insertion of more volumes into the discussion as well as additions to the general list at the end of each section. The books at the head of each list are usually of first importance to the work in hand, the revelation of space-time properties in Nature, in human form and affairs, in universals. On later occasions the outline will be completed and expanded into details fitting the whole argument together with explicit data, and discussing great subjects such as evolution, development, symbiosis, in the new state of mind. Thus sub-departments in the curriculum will be brought in, especially those important to man; human differentia in histology, embryology, and so on.

The Main Theme in Reading

The intellectual revolution is multi-form, but its force stems from the final dissipation of crass matter into electronic and nuclear systems in a field of energy, broadly of the nature of light, electromagnetic. This generalization is achieved through an argument resting upon a fateful assumption that light is a constant and the highest possible velocity in Nature. This is *the phenomenon* of our times. Phenomenon (literally, that which shows, shines) was associated in the Greek mind with the word noumenon, signifying intelligible or mind stuff. We are thus back upon the Platonic position, but with new authority. For we too now know the universe is intelligible, and the physical world the end-product of light.

This revolution in physics was accompanied by quite as remarkable discoveries in biology (chromosomes, genetics, individuation fields), and in psychology (unconscious, super-conscious, Gestalten, closure), and the sum-total of these changes affords us ample occasion and necessary means for the inquiry into the noumenon.

The noumenon turns out to be approachable through a space-time matrix endowed with ideal properties of its own, which are revealed in parts — and in increasingly significant parts — by the material, living, social and creative activities of the universe.

Since this much consonant with older views has been fragmentarily detected by present intellectual leadership in a few of its quasi-Riemannian features, we propose to call to our aid all insight available, old and new, Eastern and Western. Our charter to do so is ample. Since today's scientific data take us back to the position of Plato, Buddha, Jesus and Shankaracharya, reasonable minds must admit that if the sages were so right in the very matters which are the triumph of modern inquiries, then we are entitled to have some confidence in them as regards other doctrines in which they unite, where we have as yet inadequate information.

The intuition of the ancients was that space is Euclidean and time curved, hence their doctrine of cycles and aeons, prompted no doubt by observation of Nature. Following this suggestion, we should find the features and behavior of those entities of greatest space-time significance displaying a duality, the spatial determinant

being a symmetry which must express itself physically as symmetrical form and as harmonic series, accompanied by temporal variations on that fundamental scheme.*

The ancients were clear on one other point: Although the physical universe betrays in part the properties of the matrix, it does so in terms of succession. In itself, the absolute, noumenon, was not to them a synthesis made up of partials. In itself, it was whole. We may start by conceiving that latent order of the space-time lattices as if it were a frame on which the external universe grows, as morning glory or clematis would cover a frame and both reveal and conceal it. But of course in Nature such bifurcation is needless, as the creature grows its own frame, so to speak. Using again the language of the Psalms, in what we call evolution there is an inward glory which results in an external handiwork. That glory shines through the whole universe. Where the light condenses, matter occurs. Life and man reveal further fullness of the glory, for here too the goings-on in the handiwork betray and conceal the order ever there to express itself in the smallest and largest, the microcosm and the macrocosm. Thinking of law in terms of time-sequence, it has been well said by R. A. Samson, Astronomer Royal of Scotland, in connection with the successive discoveries of Uranus, Neptune, and Pluto as parts of the solar order, that though high originality was required, "the past was so sure that, to right minds, it suggested the future."

To get some idea of the latent order, primary topics, in science reading especially, are to be approached *de novo*. Though we propose to use scientific standards and sources until we exhaust their philosophically significant materials, we propose to go on to other experience after surveying all essential principles having general scientific acceptance. And even while incorporating the well known kinds of data, we need to be active in challenging premature assumptions, whatever the origin. There is, for instance, no experimental justification for a belief that life is but an epiphenomenon of energy, or for the devaluation of every aspect of human nature to biological process. This is not scientific theory, but unwarranted substitution of so-called scientific philosophy for the philosophy of the whole. The opposite error arises from speculative monism. No doubt energy, life, and humanity do inhere in a common ground, but this is to be demonstrated, not believed. We would like to accept the challenge of recent advances in science and to confirm the expectations of monists by showing that there is a one-and-the-same rational and aesthetic continuum operating beneath and through things, but that the connective tissue of this deep and wholesome organism is not an unvalued and odious materialism, not a cold and diaphanous energetics, and least of all to be understood by exclusive study of its mathematical skeleton. This means an arduous life and a devoted inquiry, for which the first step is the separation of good data from misleading contexts of all sorts. It also means,

*The basic reason why events governed by four-dimensional frames have this symmetry and harmony is quite simple: The diagonal of the hypercube is a rational number, namely two, if the side is one, but the diagonal is irrational in the three dimensional cube and in the two dimensional square. Since the diagonal of the hypercube is the octave number, it follows that studies of phenomena which are large enough in their space-time scale must reveal octave and harmonic principles. This does not prevent many partials from being dissonant.

further along, actual changes in daily living. For if each desires to go on doing what he now does, the world will go on to its unpleasant destiny of more violence. If philosophy is to be of any use, it should prevent a person from going on as he is, and awaken him to the fact that expecting the other fellow to change first is furious nonsense or injurious pretence.

CRITICAL EVENTS IN PHYSICS, and Notes on the Physical Field

Physical science is measurement of objective matter and energy, and includes deductions and calculations from their behaviour under various conditions in order to arrive for practical and theoretical purposes at good generalizations summed up in words such as motion, energy, and electromagnetism, each a cluster of lesser concepts, in turn constellations of laws, and points of fact.

Certain objects of physical observation are disqualified from classification into the various departments of the physical sciences, because such disbarred subjects can not be significantly studied under varied and variable conditions (temperature, pressure and the like) found in Nature or employed by the physicist for his purposes. A raw egg is of minor professional interest to a physicist. Boiled, it takes on significance.

The objects of observation thus disqualified form a residue we shall describe under biology and psychology, where we shall show that the relations which they have to space and time make them so indispensable for good over-all concepts that any ideas based on physics alone are quite misleading.

Returning to the generalization called motion, energy, and electromagnetism, if we call the whole of this field physics, then astronomy, parts of chemistry, meteorology, geology, geotectonics, geography, and so on, are departments (of man-made convenience, of course, and not sacrosanct), and physics thus embraces the bulk of terrestrial and all celestial objects. Only two relatively minute masses, life and man, are ruled out.

The critical changes in physics from emphasis upon mechanics, gravitation, etc. to electromagnetism, which occurred in the ten years prior to 1905, are well known. If more information is required, any good recent edition of a college physics text will review the body of information: COLLEGE PHYSICS, Arthur L. Kimball, Holt, New York, 1923 and later. See also THE STRUCTURE AND PROPERTIES OF MATTER, Herman T. Briscoe, McGraw-Hill, New York, 1935, and other works in that series. We need from some enterprising publisher a modern version of a book now out of print, LAWS OF PHYSICAL SCIENCE, Edwin F. Northrup, Lippincott, Philadelphia, 1917. Herein is collected a variety of laws and principles, crisply stated verbally, and accompanied by their equations, where such exist. A collection of these as of today would be invaluable, especially if accompanied by graphs or other visual interpretations whenever possible. The body of natural laws in physics is now quite large, especially if we include the constants as evidence of law. Perhaps the collection should be in small volumes, grouped by signi-

ficant relations, electromagnetic, thermal, etc., to bring out the orchestration of principles throughout the universe, and done in a framework of the meaningful hyper-physical.

The revolution in astrophysics began with the first publication of a paper on relativity and the equivalence of mass and energy by Albert Einstein in *Ann. d. Phys.* Vol. 17 (1905), and this was followed by Minkowski's lecture at a meeting of German natural scientists and physicians in September, 1908, when the first advance was made in the unification of space with time. In *Ann. d. Phys.* Vol. 49 (1911), Einstein published a preliminary theory of gravitation, formulating the elaboration in a subsequent paper in the same volume. The much-discussed cosmological considerations of the new views came from Einstein in 1917. These may be regarded as the origins of the revolution. The original papers of Einstein, which began and then enlarged the shake-up in physical theory, have been gathered together in one volume along with the contributions of Lorentz and others: *THE PRINCIPLE OF RELATIVITY*, Albert Einstein and others, Methuen, London. Much can also be gleaned from *THE EVOLUTION OF PHYSICS*, Einstein and Infeld. Best of all, a close reading of a recent book will supply the reader equipped with algebra with a good idea of the transformation in astro-physical science views as a result of these events; and we add a second volume (only for the record, for it is in terms of advanced mathematics) to complete the tale, in the parts referring to the physics of the microcosm: atoms, electrons, quanta, etc.: *THE EINSTEIN THEORY OF RELATIVITY*, Lillian R. Lieber, Rhinehart, New York, 1945. *THE ELEMENTS OF THE NEW QUANTUM MECHANICS*, Otto Halpern and Hans Thirring, trans. from the German by Henry L. Brose, Methuen, London, 1932.

For our purposes, the crucial event is in Minkowski's development of time as a dimension. We take this as a great principle, standing up above the detailed assumptions about lines of finite length, which have not so far led to a unified field theory of electro-magnetism and gravitation. Since the original papers of Minkowski, which constitute exactly the break-out from the three-dimensional world to the hyper-physical, mark the sharp corner of the turning we propose be taken deliberately, we list the sources for them separately here in their original places, merely to make an exact record of this release from intellectual bondage: *Göttingen Nach.*, p.1, 1907; *Phys. Zeit.* 10, 104, 1909; *Math. Annalen*, 68, 472, 1910.

But we cannot be content with the special kind of geometry used to fuse space with time up to date. It has not brought off, we repeat, an over-all concept for physics. In any case such a commitment is improper philosophy, for biology and psychology are not subject to the limitations imposed on thought by physics. A small book, effectively illustrated and displaying no special technical problem, will enable the determined general reader to appreciate why even a successful development of a unified field theory for physics is likely to leave biological principles outside the scope thereof: *WHAT IS LIFE?* Erwin Schrödinger, Cam-

bridge University Press, London, 1945. This may be read conjointly with *THE SOUL OF THE UNIVERSE*, Gustaf Stromberg, Mackay, Philadelphia, 1941.

Before passing on to biology, some indications may be made of the manner in which some of the properties of space-time may be made clear to the layman by a study of the greatest generalizations in physics. There is no point in incorporating lists of technical works which effect this for persons able to read them to advantage. We might mention, however, one recent application of quantum theory, which shows that the fundamental coherence of a material universe is only possible on what resembles acoustical principles. The actual linking processes of valence, which gives us the principles by which matter coheres, are today referred to as energy transfers by resonance. Roughly, atoms can build up into stable structures because of a principle something like that which allows of one tuning fork passing on its energy to another of identical pitch, and recovering it again, and so on until the energy is dissipated. This is resonance. The following is a work describing this principle as giving rise to the octahedral, cubic and tetrahedral structures which are characteristic of non-living matter: *THE NATURE OF THE CHEMICAL BOND*, Linus Pauling, Cornell University Press, Ithaca, New York, 1944.

An Example of Space-Time Properties

The splendor of the heavens affords us the most majestic latitude in both space and time. But the very immensity defeats our efforts to detect readily the scheme of things, except in the broadest fashion.

The difficulties do not arise from the vastness alone, but from the fact that we can only see the heavens. No other sense applies, except our gauging the warmth of the sun. In most experience, audible, tactual, and other information enters, but not here. In truth, the contributions of the other senses to terrestrial experience is likely to mislead us, for we unconsciously read back inapplicable assumptions from habitual tactual, audible, and other correlates of vision into our seeing of the stars. We say popularly the heavens are cold and empty, the stars are hot and destructive, and silent in their courses. We read ourselves out of the heavens by all except one octave of one sense, and then misinterpret the experience.

Nevertheless, the optical channel has been wondrously used by astronomers. As we have seen, light is the constant upon which the whole system of present-day physical thought turns. Its meaning therein, as a constant, is prodigious. When we add the many meanings of spectrum analysis, and then the significance of chlorophyll, to what light means as a constant in Relativity, we begin to appreciate the intricacy as well as the scale of the celestial glory. For though astronomy is not concerned with the celestial objects in terms of principles derived from other fields, we are so concerned if and when we discover that life is as much a revelation of space-time properties as is astronomy. The subtler meanings of light to biology and psychology can be rationally read back into astronomy, even though the heavens appear at first bare of such significance to the physical eye.

But such valid reading back of terrestrial experience into the celestial scene is far ahead of us. We have first to find out much more than we know as yet of the relation of space-time properties to all forms in Nature, and to all her processes.

As of today, we learn of four classes of celestial objects on different space and time scales, increasingly vast: The solar system, the Kapteyn Universe, the Milky way (our local galaxy), and the great series of other spiral nebulae in their totality.

The next most majestic range of space conjoined with time is geological study of the physical earth. Some remarks about this will be found in *MAIN CURRENTS*, October, 1944, pages 91-98. (We take opportunity to note an error on page 92, column 2, line 37, where Palaeo- occurs. It should be Protero- instead.)

The earth being a local scene, all elements, life, energy, and human development, enter into the concepts required. We shall not here pursue the physics of this complex subject into its ramifications in geology, palaeontology, meteorology, and the like.

In chemistry, however, we have an opportunity to investigate locally and close at hand, indeed with experimental variations and controls, the material stuff of the universe. The harmonic and hierarchial order in the morphology and classification of the elements is summed up in their periodic table, which will be found centrally framed, with appropriate data and discussion, in any good college chemistry text: *INTRODUCTORY COLLEGE CHEMISTRY*, Deming and Hendricks, Wiley, New York, 1942.

Better and most recent modifications arrange the elements according to their atomic structure (see *Journal of Chemical Education*, May, 1945, page 223). But a great deal of work, again, has to be done, this time upon the cosmological significance of the elements. For there are many ways to approach them for the deriving of concepts. The finest collection of studies known to us have been made by James Louttit, as yet unpublished. We may here make a few remarks about the usual periodic arrangement, merely to suggest one idea in reference to the space-time field.

The periodic table is based upon the octave principle, even in the case of the interpolated rare earth metals, a double sub-octave. Thus we see that the properties of matter under earthly conditions are regular functions of a fundamental order. This is shown in the horizontal component.

There is also the vertical component. In this we find significant evidence of *stages* of material densification which are assumed in most theory about planetary origins out of the solar system. As in stellar masses we conceive it proper to pass from the lightest as the earliest, to the heaviest elements as the latest. The heaviest are also unstable, in general, as if later and insecure variations on the basic theme.

1. There is a single octave of which only the extremes have been discovered by ordinary terrestrial observation: Hydrogen and Helium. This octave exploits the K orbit of electrons, one being present in Hydrogen and two in Helium.

2. Then come two single octaves, Lithium to Neon, and Sodium to Argon. In this fall additional elements so important to terrestrial structures, living and non-living: Carbon, Oxygen, Silicon, etc. These elements are fundamental in palaeontological science, as can be readily shown, and in the biology of today, as needs no demonstration. This group exploits the KL and KLM orbits of electrons.

3. The table now displays a double-octave structure, as if some vast cosmical event had occurred and is sharply registered: Potassium to Rubidium. This double-octave structure is the third stage of the table, and runs over three of the steps of the table. The last step is distinguished by the occurrence of the interpolated double-octave of the rare earth metals. Thus we may also say that the third stage involves three or, from another point of view, four double-octave steps, exploiting the MN, NO, and NOP orbits.

4. The table ends as if it were unfinished musical business, with the radio-active and unstable elements, of which Radium, Actinium, Thorium, and Uranium are best known. This exploits the OPQ orbits.

Thus the conspicuous facts of the octave system of the periodic table of the elements disclose a hierarchy of four stages.

Accompanying these vertical stages is a notable item. If we regard Hydrogen as a metal and Helium as a non-metal, we notice that each *line* (single octave) of the table thereafter contains one fewer of the non-metallic elements. Thus, in the second octave are two metals, Lithium and Beryllium, in the third there are three, Sodium, Magnesium, and Aluminum. The next row is the first of the double octaves, and it begins with an octave that is all metals, and the next four elements are also metals, and thus the non-metals are reduced to four, in this lot. So the table, regarded as the register of a series of cosmic and terrestrial transformations, replaces the majority rule of non-metals, until at 85 and 86 we are down to two, and can assume that if the OPQ series could be continued to the end, it would conclude with one non-metal, 104, and that the next octave would be all metals. One is tempted to suggest that the work of real space-time is nearly completed as regards its expression in matter.

Let us now recall that a peculiar feature of metals is their conductivity as to electricity, also that the relation of thermal and electric conductivity is close, and that the significance of thermal limits to life is great. We might regard the periodic table's series as something contrived in the space-time matrix, responding to the characteristics latent in that matrix as it evolves. The impacts or pressures of the superior causal source of properties has then been registered,

we observe, in four highly characterized stages, of which three are rounded out, and the fourth incomplete. Are these stages, then, not a record of space-time events on a cosmic scale?

If so, it may be fertile to hold in mind the idea that other cosmic space-time properties can be studied successfully if all the pertinent data in every department of physical science be brought into sharp focus. Such an inquiry will be a long and fascinating course of work, making opportunity for valuable doctorates in philosophy, seeking conformities and disagreements in the conspicuous elements of astronomy, geology, the chemistry of the non-living, meteorology, etc., as preliminaries to even more enriching generalizations embracing biology and psychology.

We shall return to these topics in MAIN CURRENTS from time to time. Meanwhile it may be suggested that in Physics the special object in reading is to realize (1) that the physical world is a thin veil over a deeper reality, (2) that the human mind can reach into this deeper reality to discover principles in common between human thought and feeling, and common *both* to that Nature apparent to our sensory equipment and the deeper universe appreciated by our intelligence, (3) that this deeper structure is now known to be in some sense a four-dimensional framework of operations, (4) that the four-dimensional (space-time) system Nature actually displays in her physical world goings-on has more resources than are used to explain phenomena in physics, (5) that a remarkably simple order can be detected in that structure, and (6) that the order in question is basically harmonic, resonant, musical, as documented by the finest contemporary established knowledge.

Serious students would do well to consult, as required, recent text books at college level for such subjects as have main bearing on the work in hand. In physics, for example, a general understanding of the nature and uses of the spectrum is important; some notions of the different kinds of motion studied in this science are desirable; the basic facts of the physical science treatment of sensory experiences are indispensable. In biology and in psychology similar fundamentals should be part of general knowledge.

For those who feel unequal to the task of immediate and complete intellectual self-uprooting, the well known works of Eddington and Jeans are useful enlightenment, particularly the former, whose technical writings include an effort to solve the problems of field physics by a geometry of points instead of by a geometry of lines of finite length. These explorations are reflected in his non-technical writings. We group together here some serious general discussions and a few popular books.

THE LOGIC OF MODERN PHYSICS, P. W. Bridgman, Macmillan, New York, 1927, provides the exact identification required from a physicist of the *operational* concepts of space, time, causality, identity, velocity, force and mass, energy, thermo-dynamics, electricity, light, rotational motion, and of quanta, required (at that date) from that domain for over-all thinking.

THE ANATOMY OF SCIENCE, Gilbert N. Lewis, Yale, New Haven, 1926, discusses much the same field but provides exact knowledge of the critical decisions about the geometry ascribed to nature by relativity.

THE NATURE OF THE PHYSICAL WORLD, A. S. Eddington, Cambridge, 1928.

THE BASES OF MODERN SCIENCE, J. W. N. Sullivan, London, 1928, New York, 1929.

THE MECHANISM OF NATURE, E. N. Da C. Andrade, London, 1930.

THE EVOLUTION OF SCIENTIFIC THOUGHT FROM NEWTON TO EINSTEIN, A. D'Abro, New York, 1927.

NEW PATHWAYS IN SCIENCE, A. S. Eddington, Macmillan, New York, 1935.

THE PHILOSOPHY OF PHYSICAL SCIENCE, A. S. Eddington, Macmillan, New York, 1939.

THE MYSTERIOUS UNIVERSE, James Jeans, Macmillan, New York, 1938.

THE NEW BACKGROUND OF SCIENCE, James Jeans, Macmillan, New York, 1933.

THROUGH SPACE AND TIME, James Jeans, Cambridge University Press, 1934.

AN ORIENTATION IN SCIENCE, Watkeys and Asso., McGraw-Hill, New York, 1938.

MAN AND HIS PHYSICAL WORLD, Dwight E. Gray, D. Van Nostrand, New York, 1942.

MATTER, MOTION AND ELECTRICITY, Smythe & Ufford, McGraw-Hill, New York, 1939.

PHYSICS, THE PIONEER SCIENCE, Lloyd W. Taylor, Houghton Mifflin, New York, 1941.

MATTER, ENERGY AND RADIATION, Dunning & Paxton, McGraw-Hill, New York, 1941.

MR. TOMPKINS EXPLORES THE ATOM, G. Gamow, Macmillan, New York, 1944.

GRAMMAR OF SCIENCE, Karl Pearson, E. P. Dutton, New York, 1937.

THE HISTORY OF SCIENCE, Sir William Dampier, Macmillan, New York, 1932.

TREASURY OF SCIENCE, Harlow Shapley, Harper, New York, 1946.

DEVELOPMENT OF PHYSICAL THOUGHT, Loeb and Adams, John Wiley, New York, 1933.

ASTRONOMY, Russell, Dugan and Stewart, 2 vols., Boston, 1926, 1927.

STELLAR MOVEMENTS AND THE STRUCTURE OF THE UNIVERSE, A. S. Eddington, London, 1914.

This work is for mathematical readers; so is also the same author's THE INTERNAL CONSTITUTION OF THE STARS, Cambridge, 1926.

A SOURCE BOOK OF ASTRONOMY, H. Shapley and H. E. Howarth, New York, 1929.

CRITICAL EVENTS IN BIOLOGY &

Notes on the Field

The above assignment of conceptual responsibilities to physics leaves a very small local residue of matter and structures which turn out to be extremely puzzling until one applies new standards to it: the so-called biosphere of terrestrial life, really a thin shell, an envelope a few hundred feet thick over the earth's solid body of 8,000 miles diameter. If we assign the

magma and crust of the earth, the air, the meteorological shell (atmosphere and higher ionized states) and astronomical objects to physics we are left with a film of living molars, scarcely more than a delicate web of life. The most highly organized of living creatures, such as trees and mammals, form a biological tissue in thickness approximately a five- or ten-thousandth the diameter of the material earth and its electromagnetic extension.

This is truly a mere bubble. It is not only thin, but far from dense, even in its mid-most lamination at and close to sea level. Human beings, domestic animals, wild animals, fishes, birds, insects and the rest of it thin out steeply into the crust and deep seas, and more steeply upward. This mass *in space* is of little consequence, but as a continuum *in time* it is very remarkable indeed, an epithelial membrane. What is it which holds the film together through the millenia? Whence originate the wonderful variety and beauty of its individual forms? What real world is revealed herein, as "passage of time"? How is this terrestrial life-bubble related to that other film, the photosphere of the sun?

It has been tempting to think of and treat living organisms as if they were non-living. A living cow weighs so much, has a certain average density, displays a certain electro-potential, while alive. But all this by itself is physics and certainly (except the last item) is not very important to biology, if biology is to result in good new generalizations (to be "explained"), and hence elucidate the special subject matter which eludes physics. If we desire to describe the universe fully, we must admit the existence of a science which concerns itself with the relation of irritability, sentience (and conductivity), and mind (with co-ordinate organization and purposeful mobility) to certain self-perpetuating, evolving forms.

These forms are not describable effectively in statistical terms. They display a curious feature, *self*. They are self-forming, self-perpetuating, and may be self-moving. Living individuality has invariable form, behavior, and functions amounting (subject to evolution) to an absolute, and certainly has no random or average character primarily. Cows do not give birth to calves on the average, to fawns every few years, and lambs now and then. Their other habits are highly characteristic. They do not jump over the moon. The printed accounts of this phenomenon have been widely discredited.

Biology is thus a science no less if not more important conceptually today than physics, because it undertakes to systematize and generalize phenomena of as intense significance to time and some subtleties of space, as those studied in physics are to space and some aspects of time. That biology has not been attending to its business of principal import to philosophy is unfortunate, but this omission can be remedied. It may first be defined.

The materials of biology surely have no conceptual meaning separated from irritability, sentience, and mind. Attempts to understand these three attributes of the living in three-dimensional physical terms have been unfruitful. Hence biology has remained a good deal at the descriptive level as regards its special subject-matter,

and has tended to submit to the conceptual claims of the physicists.

Such submission is a failure to see that aesthetic emotion and intuition of truth are not less than co-equal with measurement and logic, even for understanding, let alone living. We have only to consider what the world would be like if one could observe it devoid of living creatures, a true desert, not even an insect or aerobe, and of course no human, a dead world, insensate and without those meanings we first see in life and then sense in or transfer to the physical environment by means subtle and innumerable. In truth, it is utterly impossible to imagine what one would experience, if one could look upon a lifeless planet, because we can only look through a living organism, our self.

To describe life in terms of four dimensions, it is necessary to collect and examine instances of cyclism, metamorphosis, time-lag in embryological development, and the like. In Nature these in some cases correlate with solar events which can be simulated in the laboratory, as when light is artificially supplied to plants. But other time-cycles have deeper meaning, as when the phases of the moon are registered in the electropotential of a tree. We might call the merely repetitive cycles of astronomy revolutions and the biological cycles evolutions, great and small, with reference to the remarkable transformations which result in such cases as metamorphosis, especially.

Critical events in biology attended the discovery that these living cycles root in minute structures called chromosomes, in the sense that continuity in time is ensured through them. They are thus the geometric determinants or agencies, of molecular dimensions, which continue specific forms in time as crystal ions and space lattices are specific in that kingdom. The living cell is hence considered an aperiodic crystal, and the parallel between evolution and genes in biology, and celestial revolutions and atoms in physics is close. But note that an entirely new philosophical entity comes into the picture now, *function*, linked with specific form persistent and self-adjusting in time, and associated with irritability, sentience, and mind. We know of function directly in mankind, and the fact that many afflictions have no organic disturbance as their seat but arise in emotions and result in physical disorder has given rise to the belief that psyche and soma are parallels. Our purpose is to create a psycho-biology which can be traced down the hierarchy of kingdoms from mammals through plants to crystals, inquiring how the *form* elements come from the space-potential and the *function* elements are related to the time sector. The purpose is to disburden the study of human psychology and physiology of the immense and unmanageable load thrown upon them by having nothing clearly conceived about life functions where they first appear, in lowly estate.

The proposal involves a conceptual partition in chemistry, assigning not merely organic chemistry but all forms of this subject not strictly physical chemistry to a place where specificity of form and property in chemical elements is seen as the beginnings for form and function in living organisms. In this way we can see more closely the apparent bifurcation of the primordial into life and matter in the heart of Nature, in

preparation for understanding the apparent bifurcation into life and consciousness. When we thus look deeply enough into the body of knowledge shaped along conceptual lines, we may at last be able to understand on good terms, retaining values and beauty, that there really is no bifurcation whatsoever.

The creation of a biological psychosomatics as a preliminary to understanding body and psyche in mankind implies an understanding of the relation of four dimensions to three, now in relation to life. For growth and form thus understood mean that phenotype and genotype are understood. This cannot be done through studies of sequence alone. By simple analogy we understand that it is impossible really to interpret duration from sequence. For instance, a cube gives us the property of volume which cannot be built up by adding planes which have no thickness. No matter how many times one looks at a plane no sense of volume arises. Similarly, watching the growth of a seed to maturity in the plant does not reveal the space-time reality, but just a series of forms in time sequence. To solve this problem there is a mathematical technique to be applied. Measurement along a line is said to be scalar. By attributing a force to the length of the line and a force to another line, we can determine the direction and amount of force applied upon another line called the resultant. This brings surfaces into play, actually. This is called the study of vectors. A further stage has opened in mathematics, the study of surface forces treated so that they will lead on to forces in a mass or three-dimensional volume. The system is now called a tensor. The step to the four-dimensional matrix is analogous.

In the case of biology the shift from scalar, to vector, to tensor, to matrix has to be taken with irritability, sentience, and mind consistently in view. Somewhere between the centrosymmetrical crystal and the linear-symmetrical plant, low-level response comes into play. Between plant and animal, sentience is translated into mind, as line symmetries give way to bilateral symmetries. Applying proper techniques to this sequence, there is every reason to have confidence that we can at last break entirely out of the confinement to physical-level thinking, taking the living content with us along with the mathematical skeleton. The accumulation of mathematical studies in biology is now considerable, but they are almost entirely confined to three-dimensional treatment. Sir D'Arcy Thompson at last re-issued his classic work, *On Growth and Form*, in 1942, after it had been out of print twenty-five years. No reference is made in this revised form to the space-time polytopes which unravel the entrancing mysteries of nature he has so uniquely recorded.

We repeat: The mere addition of time-lapse to morphology is not enough. We anticipate a biometrics parallel to the space-time metrics of physics; but if they are to be meaningful they must have constant reference to the psychic content of life. By discussing human psychology in this connection (in the next section of reading), a little further understanding of the requirements for this enriched biology might be indicated, although the whole operation proposed is a really formidable task, requiring a large body of collaborators and steady application.

In *Biology* the object in reading is to realize that the harmonic order referred to under physics, now appears, in living kingdoms, with new opulence and subtlety as chromosomes, genes, cell shapes, tissues, organs, biomes; as time-and-volume variations in development, as cycles, and (of superior importance to the general observer for our purposes) as form and function and hence as systematics, which is to say order as taxonomy and classification; and that a new ingredient has appeared: self-formation (crystals), sentience (plants), and mind (animals). Just as effective knowledge of contemporary physics requires resolute pursuit of fact, law, truth, concerning certain aspects of the underlying order, so also in the case of biology these are necessary, but now at a higher level of harmonic order, and with the addition of beauty, feeling, and meaning, because here appear self-formation determined by space-time lattices, self-perpetuations, and purposeful self-mobility. In biology understanding is impossible without some concept of self in contemporary space-time (transcendental realistic) terms of reference.

The undernoted books are of direct value for our purposes. Other works will be mentioned when we deal with the section of reading concerning the theory of harmonics. We have already referred to Erwin Schrodinger's little book, *What is Life?* (Macmillan, New York, 1945) For like reasons the writings of Gustaf Stromberg are also important. The author is a physicist, but he is addressing himself to establishing reasoning which will bring genetic principles, sensory experience, and other living devices into an area of thought common with material science. A volume of collected papers by Dr. Stromberg will appear shortly, from David McKay, Philadelphia. Among biologists, the studies of H. S. Burr of Yale University and the writings of Joseph Needham rank high, for our purposes, and the guidance of E. S. Russell is nearly indispensable.

- ON GROWTH AND FORM, D'Arcy W. Thompson, Macmillan, New York, 1942.
- THE CURVES OF LIFE, T. A. Cook, Holt, New York, 1914.
- AN INTRODUCTION TO MATHEMATICAL GENETICS, Launcelot Hogben, Norton, New York, 1946.
- ELEMENTS OF PHYSICAL BIOLOGY, Alfred J. Lotka, Williams & Wilkins, Baltimore, 1925.
- GENERAL BIOLOGY AND THE PHILOSOPHY OF ORGANISM, R. S. Lillie, University of Chicago Press, 1945.
- LIFE—OUTLINES OF GENERAL BIOLOGY, J. Arthur Thomson and Patrick Geddes, 2 vols., Harper, New York, 1931.
- BOTANY OF THE LIVING PLANT, F. O. Bower, Macmillan, London, 1939.
- THE STUDY OF LIVING THINGS, E. S. Russell, Methuen, London, 1924.
- BIOLOGICAL TIME, Lecompte Du Nouy.
- HUMAN DESTINY, Lecompte Du Nouy, Longmans Green, New York & London, 1947.
- THIS IS OUR WORLD, Paul B. Sears, University of Oklahoma Press, 1937. This deals with life and its environment. Written in the simplest style, understandable, simple, without veneer or pretense and humbly philosophical.

- MAN AND HIS BIOLOGICAL WORLD, Frank Covert Jean, Colorado State College of Education, 1944, Ginn & Co., Props., Boston. The authors (Jean. Harrah, Herman & Powers) are aspiring to an educational philosophy by cutting across the sciences in order to achieve larger life values.
- ESSAYS ON PHILOSOPHIC BIOLOGY, Wheeler, Harvard Univ. Press, Cambridge, 1939.
- THE BIOLOGY OF THE CELL SURFACE, E. E. Just, P. Blakiston's Sons, Philadelphia, 1939.
- ORDER AND LIFE, Joseph Needham, Yale Univ. Press, New Haven, 1936.
- THE DIRECTIVENESS OF ORGANIC ACTIVITIES, E. S. Russell, Cambridge, at the University Press, 1945.
- WHAT IS LIFE, Augusta Gaskill, Charles C. Thomas, Springfield, Ill., 1928.
- ANIMAL ECOLOGY, Charles Elton, Oxford Univ. Press, New York, 1930.
- THIS LIVING WORLD, Clark and Hall, McGraw-Hill, New York & London, 1940.
- THE BIOLOGICAL BASIS OF INDIVIDUALITY, Leo Loeb, Charles C. Thomas, Springfield, Ill., 1945.
- ANIMAL LIFE AND SOCIAL GROWTH, W. C. Allee, William & Wilkins, Baltimore, 1932.
- ANIMAL BIOLOGY, J. B. S. Haldane & J. S. Huxley, Clarendon Press, Oxford, 1927.
- FOUNDATIONS OF BIOLOGY, L. L. Woodruff, 6th ed., Macmillan, New York, 1941.
- EVERYDAY BIOLOGY, J. Arthur Thomson, Geo. H. Doran, New York, 1924.
- OUTLINES OF EVOLUTIONARY BIOLOGY, A Dendy, revised ed., Constable, London, 1923.
- THE INTERPRETATION OF DEVELOPMENT AND HEREDITY—A Study in Biological Method, E. S. Russell, Clarendon Press, Oxford, 1930.
- THE NATURE OF LIVING MATTER, L. Hogben, K. Paul, Trench, Trubner, London, 1930.
- THE GENETICS OF SEXUALITY IN ANIMALS, F. A. E. Crew, Cambridge University Press, 1927.
- THE FEMALE SEX-HORMONE, R. T. Frank, C. C. Thomas, Springfield, Ill., 1929.
- THE MECHANISM AND PHYSIOLOGY OF SEX DETERMINATION, R. Goldschmidt, Methuen, London, 1923.
- KORPER UND KEIZELLEN, J. W. Harms, J. Springer, Berlin, 1926.
- THE INTERNAL SECRETIONS OF THE SEX-GLANDS, A. Lipschutz, W. Heffer & Sons, Cambridge, 1924.

PSYCHOLOGY, and Notes on this Field

Just as physics leaves to biology a residue for special consideration, so biology in turn is conceptually unequal to the task of framing a third residuum, and thus we have a new science, psychology. The separate history of this subject is only about as old as the intellectual revolution, hence most of its content is of direct value to our present purposes.

The border between biology and psychology has until lately been without sharp definition, so a brief reference to this is necessary.

Self, together with the seriatim appearance of irritability, sentience and mind, we have said are basic to biology. If chemistry be conceptually re-organized conformably to new demands, it becomes possible to trace self down the hierarchy of life and form into that something in atoms which fore-shadows self. In the opposite direction self continues into the human kingdom, along with mind and its fore-runners.

But we observe a sharp edge in the transition. Man displays a capacity to examine portions of self, much as he can examine matter. In fact, biological-psychological self is the object of immediate awareness, and so-called lifeless matter is studied at at least one remove.

Furthermore, associated with this unique attribute of self-consciousness is a variety of new psychic activities, some quite original with man, and others mere rearrangements of parts of self-displayed by higher animals. Recollection and anticipation are genuine advances over mere associational memory in animals. There is also a re-organization of the mammalian structure, with upright carriage, the opposed thumb and deft hand, the several uses of the voice, development of the forebrain and nervous system, and so on to the making of tools. Here is a significant complex. For though Kohler's work shows us that some primates can use simple tools, the objectivity to self and to its work required to make and to perfect tools is not present in any other species than ourselves. All this is alphabetical in the science of man and should be primary in psychology.

Self-consciousness, the critical event in evolution which is associated with all this, is connected with the relation man has with time, and displays a new time-related feature, namely, continuity of identity. In physics time may be recorded in random occurrences, if we care so to think, in spite of what has lately happened in that science. In biology time is ordered or connected with events of order, accretion, growth, and purposeful mobility (the order here being meaningfulness). With man appears a sense of duration. He has history, planning, fore-knowledge of Nature's activities. Thus we find in biology and in human psychology those second and third degrees of freedom implied by free motion in three dimensions. We are warranted to confirm and enabled to explore three dimensions of time fore-shadowed by physics.

Questions peculiar to psychology, therefore, have to do first of all with consciousness; and that will turn out to be something well described by the American phrase, a tough assignment. A little less difficult are the questions which have to do with the re-arrangements of mammalian psyche and additions of new features in man. A distinction can well be made here between the natural psyche (in Freud's sense), and the human soul (in Plato's sense). Traces of these peculiar evolutionary events must also be expected and indeed are seen in physical re-arrangements in man of the mammalian structure. Whatever comes out of the latter search, we can fully assent to the continuance over into man of the psychic activities in animals which are associated with reproduction and the vital urge, the herd instinct, and personal mentality. (Perhaps a full assent to this would help us to prevent these natural features becom-

ing neuroses and psychoses of the sex, herd, and ego complexes).

All this Freudian animality is foreground to consciousness, even when walled off as the repressed or deep unconscious. Man, upon evolving and in the process of evolving, takes over a psychic organization, just as he takes over bodily organs from the mammalia. But several things happen to both. As he can be objective to his psyche, he can and he does perfect this primary apparatus in the psyche, just as he can and does walk erect and does develop his body by conscious intelligent living in fresh air, right food, abstemiousness, if he cares to. A good case can be made for his increasing inability or not caring as a concomitant of the ascendancy of behaviourism.

But besides these new uses of old devices, much more happens with and in man.

The psychological studies with started with von Ehrenfels and are now called Gestalt Psychology contain several independent important gains. If the student will study the event called closure, in himself, he will see that consciousness is deeper than volition, and deeper also than the experience called meaning. (See MAIN CURRENTS, January, 1944, page 5, for a familiar instance of closure experiment). Independent and direct interpretation of this shrewd experiment shows us that without change of sense data, we can observe volition altering meaning, and we can even detect an energy content in the shift of meaning. It has appreciable force as it moves over. Having experienced that, now add our daily experience of our feelings, vital tone, bodily state, and we are compelled by simple fact to say that human consciousness has before it, stretching out to the physical world, a hierarchy of experiences, body, psyche, and soul, besides the experiencer himself. Body and psyche are shared with animals, but re-arranged. At all levels, portions of this complex are within reach of

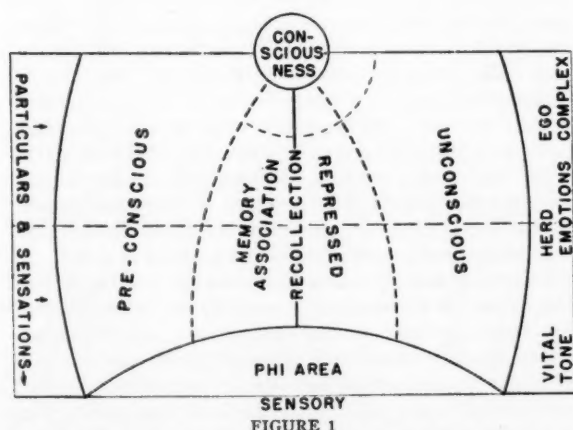
recollection, and portions are not. At the bodily level, the major activities go on unnoticed. In the psyche some are quite beyond all observation by the individual himself, though they may affect or determine his behaviour. The relation of Platonic soul to consciousness is to be examined later.

We may accommodate this part of the Gestalt gains with the Freudian discoveries in a single diagram, Figure 1, in which we put the unconscious at one side and the foreconscious content on the other, with the partition of associational memory, recollection, and repression between, serving to communicate and to separate. This is an accommodation of Freud's anatomy of the mind. (See cover of MAIN CURRENTS, July, 1946, for Freud's diagram). In the present arrangement, Figure 1, we represent consciousness as a circle, perhaps it should be a point, having communication with the perceptual field, but cut off from the encysted unconscious. The horizontal lines are intended to suggest the hierarchy of meaning, emotion, etc., outward from consciousness.

In addition to all the foregoing, there is a class of experiences which have either been lost to view entirely or, when discussed, are often treated indecisively or regarded as pathological. It is one of the known historical afflictions of depth psychology that much of it arose from the study of sick people or criminals. Such habituation made fatally easy to dismiss all variations from some artificial norm as disease. For some the extrovert became the ideal, and the term introvert a reproach. The extroverts having brought us where we are, their stock is a little low. In truth, associated with consciousness is a capacity for abstractions, for self-development, universals, generalization good and bad, intuition, imagination, ethical feelings larger than tribal or family contexts, delicate aesthetic experiences, deep satisfactions not necessarily egotistical connected with effective mathematical work, religious experiences, mysticism of nature, phenomena which are classed under the head of parapsychology, and the like, much of it of high import to the healthy unusual individual and to society.

These matters more than any other require re-examination in today's enlarged framework of thought. This kind of question is put in review exercises in general psychology: "Why can there be no knowledge without sensory experience?" It would be well to remember that an opposite question is invariably implied and should be stated: "What is the nature of humanity that the individual can learn to respond and to perform as he does when he learns through the same sensory experiences as mammalia generally?" We are getting constantly closer to answers to both these questions, but the second requires special consideration because it refers really to the abstract or universal.

It is here that the second important contribution from Gestalt studies comes into play. For it is shown that man has this sense of the whole. (It is significant that detection of this capacity for generalization, and recognition of the particular in the class, began with the study of music). At any rate it is quite improper to speak of general psychology and the anatomy of the mind today without including these well-established data. We



Freud's well known "structural relations within the mental personality" (New Introductory Lectures on Psycho-Analysis, p. 111) re-arranged so that the physical system (denominated Phi area and sensory, above) is shown in contact with pre-conscious, associative functions, repressed, and unconscious, and the complexes arranged in a vertical hierarchy, the "most mental" one (ego complex) most remote from the sensory system, and the whole treated merely as a unitary system capable of maintaining a "steady state", displaying no features not admitted by behavioral psychology. Lateral connections with the environment both ways, through pre-conscious (or perceptual conscious) and through unconscious are suggested to account for lower levels in parapsychology, a subject which requires reexamination in terms of the whole literature.

might suggest what is involved by adding a new part to the previous figure.

In Figure 2 we group near consciousness terms suggesting important experiences which lie, as it were, not before but around consciousness, not well within focus, somewhat elusive to volitional control; and even resources in man which lie right behind consciousness, as we know it in ordinary life. The suggestion is that the Id of psycho-analysis reaches from the unconscious, the particular, and the habitual, to the unnoticed general and new. Likewise the Super-Ego may trade with the perceptual conscious in the foreground and also with the (now somewhat noticed) general or abstract aspects of mind. Consciousness operating toward the source (upward in the figure) may be considered as peering homeward through intuition, and operating toward physical experience or particulars in the mind, downward in the figure. As to the horizontal, we cannot,

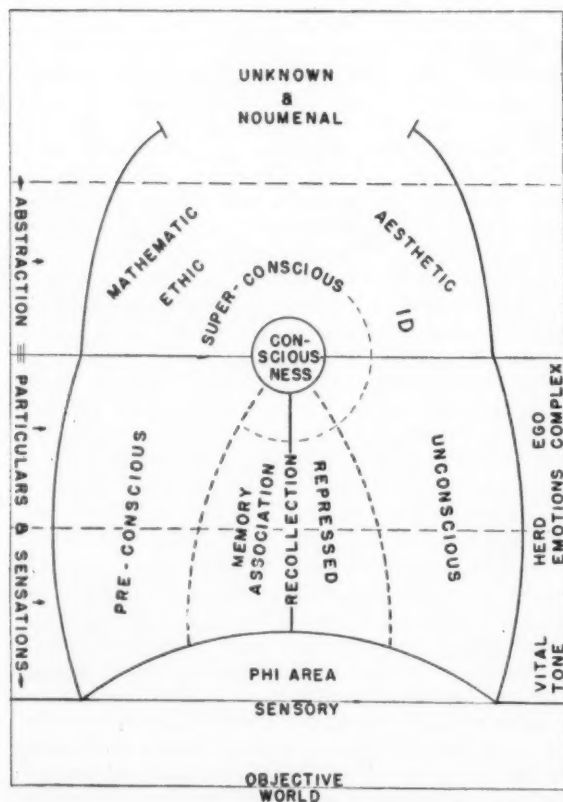


FIGURE 2

The lower half is identical with Fig. 1. Above consciousness has been added a range of unknown extent to the hierarchy of human functions. The individual is now described as being capable of functioning in a domain more abstract (of higher dimension) than the world of particulars known to personal life taken in behavioral terms alone. The multi-dimensional universe is implied. The upper level of the human constitution may be conceived as trading with greater dimensionality and hence the relatively less divided. At this level, of concepts, he is therefore individual. But individual requires a mechanism for expression in more limited dimensions, hence personality, literally mask. All these terms are in use in different schools of psychology. But we would go further and suggest that there is an environment at these levels, and the exchange with it, even less well focussed and more damped down than extra sensory perception. Lateral trading with the conceptual dimension may be independent of the connection with still higher resources suggested by leaving the enclosing arc open at the top, whereby something opposite to sensory experience is provided for in the diagram.

in the face of parapsychology facts, wall man off from his psychic environment any more than from his physical circumstances, so we here suggest that we consider soul (in Plato's sense) as a speculum to Nature deeply buried where universals are at work, just as psyche is in touch with its own environment of particulars.

On these topics, and in the general healthy proportions of human nature as a whole, a great deal of work has to be done—likely to be done well only after the steps we described in reference to physics and biology have been taken.

Much re-evaluation is required in the study of our senses, as well. The senses are ordered on scales, as we see clearly in hearing, and in sight. Our account of touch, taste, and smell is less clear, but progress is being made. (See Hoisington, page 33). The mind may be as imperfectly ordered as the senses, which operate like poorly spaced grids through which we perceive partial reports of the natural order.

In our studies, in short, we are proposing that it can be shown that man stands midway between the space-time light, and matter, the earthly condensation thereof; that his intuitions look homeward and his intellect looks earthward; that these two are the polar ends of the intelligible principle, insight, or soul, closer in at the heart of things than is the Freudian psyche; that in the ill-formed and defeated individual the psychic conflict is increased by a system of learning which informs the student of a few of the earthly partials of nature but denies him the education in principles which would awaken in him the warm glow of inner confidence. Even if surgical, medical, psychiatric, psycho-analytic, institutional, and every other remedial measure were made available by concentrating expenditures on them instead of on wars, we would still have to feed the intelligible soul so that it can inform the psyche confused by the kind of motion pictures, newspapers, and radio comics we now turn loose on youth. The educational system alone can supply useful knowledge of the principles or universals, and it will only simplify and not complicate its labors when it communicates information and skills in an atmosphere of conceptual integration. Conceptual integration means fusion replacing confusion among the arts, philosophies, religions, and sciences; and since the products of these disciplines are ejects from the nature of man, the process parallel to the external unifying of the disciplines is the discovery and assent to an inner organic unity of those features of the human make-up from which the cultural moods do the ejecting into the stream of history. Let us believe that it can be shown that, at their lowest levels (though all trade with the creative source) the disciplines are associated in a manner of peculiar significance to emotion (art), concrete mind (science), abstract mind (philosophy) and intuition of the good (religion): that this cultural apparatus is the heart of the human inner organism up to this point of evolution. No doubt between this cultural centrism and its outward expression lies the veil of vital and physical existence through which the inner wealth has to come. But equally it may be that *beyond* the cultural nexus in which the four disciplines root is a veil of another kind, now between

man and ultimates, or God. The good life must consist in piercing both veils. The thrust must be two-way.

But a practical problem is involved for the educator: We are strong, as a species, in art and science, because these are at the concrete level of experience in most practitioners. On the other hand, at present man is weak at the philosophical and religious levels, because these positively require abstract or generalized or universal applications. Art and science would be the better for such universality, but they can get along somehow with little of it. In religion, however, love of all mankind is the clue, not love of self, a few, a family, to exclusion. In philosophy the indispensability of generalized or over-all thinking is quite obvious. As we are only half-evolved creatures, we are pretty good at the concrete, and poor at the abstract levels.

Furthermore, the school system has deprived itself of good (comparative) religion and, indeed, of most religion. It is also disastrously deficient in active, workable, not overly speculative philosophy. This miserable deprivation and general bankruptcy is pointed up all the more powerfully by the way in which we magnify one or two names, such as that of Dewey, splendid as may be that connotation and his achievement. We have to get straightened up on comparative religion and comparative philosophy, and also modernized in both, and then we can tackle the two veils; we can press through and help the student to press through both ways. Outwardly or extrovertly a really good and worthwhile life can come if it be lived securely against a rich background of abstract mind principles and intuitions of the good life made lively and real. And by the same achievement we shall come to penetrate inwardly or introvertly to the rich creative resource. To get access to this, a well-organised (comparative) philosophy and religion are essentials.

It should be quite obvious that such an enterprise is hopeless unless some general agreement can be had as to the constitution of the individual in something like adequacy. The more exact and comprehensive we can make our agreement, the better for the educational system.

In *Psychology* we may say, in sum, that the object of the reader should be to arrive at a clear appreciation of the significance of the several major developments in this comparatively young science, and to try to understand these developments in an atmosphere free from the implications of the physicalism which dominated western minds throughout most of the brief history of this young science. If studies we suggest in *Physics* and in *Biology* precede the reading in *Psychology* such historical freedom of judgment is more easily attained. Nevertheless, self-conscious efforts must be made to be alive to the basic elements. The books suggested will themselves describe the various aspects of the subject, such as introspective psychology, measurement psychology, and the like. All are important, but for our purposes emphasis must be placed upon the psychology of the unconscious (depth psychology, in general), which documents fully the identity of a certain (and, behaviorally; a very large) part of human nature with the psychology of non-human creatures, especially mammals; and upon experimental materials collected in

Gestalt Psychology, which document high-level and conscious activities, meaning, and the like. Hence, the reader is urged to examine an experience such as closure for himself, making efforts to evaluate all of this in the new atmosphere required by modern thought. In addition some acquaintance with parapsychology is necessary.

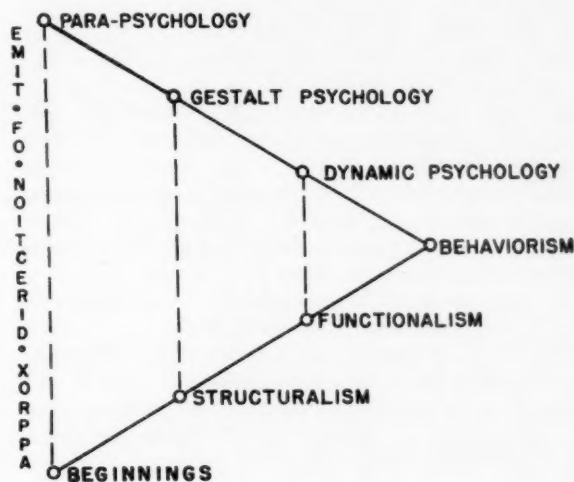


FIGURE 3

Above is suggested a relation in fundamental similarities between branches of psychology, displaying cyclism in historical development. Time lapse is vertically upward. It is realized that the treatment is necessarily over-simplified. We owe this provocative study to Viggo Westergaard, who suggests that we may regard behaviorism as the nadir in the history of psychology, denying mind flatly. The cycle begins, of course, with the separate history of psychology as a science, passes on to structuralism, functionalism, and so on, to full round in parapsychology. The corresponding points in the cycle are linked (by the dash lines), and represent the following resemblances: Functionalism and dynamic psychology share a pre-occupation with "operation", the former emphasizing flow of conscious experience in its natural environments, using varied introspection and biological investigation as methods. The latter is concerned with "whole processes", following unfoldment from cause to effect and using mental tests. Structuralism and Gestalt psychology have interests which meet in the part-whole problem, the former maintaining that parts are primary and wholes are built from them. The latter reverses the emphasis. Finally the initiating of psychology as a science is seen in the labors of Fechner, Lotze and Wundt in determining priority for mind in the study of mind and action. In the case of Wundt we see considerable dependence upon introspection. A curious and significant return to the original problems is seen at a higher level now, in parapsychology. The introspective element in parapsychology is indispensable, our only report is from the percipient's self-examination in extra-sensory perception. Mr. Westergaard's interesting suggestion indicates that we are on the threshold of a truly remarkable period in psychology.

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CONCERNING ANTHROPOLOGY

The literature of personal, individual, and social psychology, immense though it be, is still inadequate to form a science suited to stand beside physics and biology, in their extended modern meanings. Anthropology, the over-all science of mankind, should be that field, but as it stands today it can hardly claim its rightful place, as we are here organizing learning. For although it is established that man does not inherit his culture biologically, the means of that inheritance have not been established. Although man is a species, he is in so many ways different from a biological species as to raise entirely new philosophical questions about his specific nature. The origins of races, even the most recent group which originated the Indo-European languages and was at one time without doubt a well-established physical

type, remains highly speculative. Even physical anthropology, resting upon ingenious measurements, works a good deal at the descriptive level and depends upon highly speculative assumptions for its theory.

We are approaching a time when the contributions from psychology to an over-all science of man may be decisive. For the most important features of human life originate in our inner natures, and there we can already begin to shape up in rational form two quite different truly human functions. There is this ingredient which appears to us as continuing identity, the cognitive function. The puzzle in psychology is what this may be in itself. Associated with that stark fact, which has to be accepted in simple piety, is the complex of mental functions of an abstract character. The unsolved problems of anthropology must continue to deny it equal rank with physics and with biology so long as we are unable to identify what it is we mean when we think of man, as a universal in experience. We have many sound elements in the concept of energy which give it general acceptance. Even life is a clear idea, and offers many evidences of a new aspect of reality not displayed in energy, quite contrary in fact to the behaviour of energy. If we could equally well identify a single embracing principle for mankind, anthropology could begin to take its place.

Such a central principle, however, escapes us, in a strict sense of science. There are not fewer than four different levels of response in man, simple nurture, personal training, (schooling), and higher learning or true education, and the raw cognitive function itself. The two latter mark us out as human. In the most primitive societies, such as the Australian aborigine, living in a stone-age state, Spencer and Gillen long ago found the notion of an abstract (that is, not localized) deity, an idea we regard as a peculiar achievement of advanced society. And at the other end of the scale we are able to collate studies of the lives of religious teachers which show us that while stone-age man lives alongside the sophisticated modern, an occasional individual appears so far ahead of us as to make us all savages by comparison. It is clear, therefore, that much work must be done to distinguish between the two higher levels of learning above enumerated before we can get at the central idea of human nature.

For this purpose of deciding what is our true nature, the psychological factors in religion are foremost in importance. Every sage and seer, every mystic and contemplative, has testified to a range of experience (illumination) which results in a healthful transfiguration and a concomitant experience of human solidarity. We must suppose that such a spiritual experience consists in a metastrophe or a Nirvana which reveals the real character of consciousness, no longer individual and separative, but universal and unifying. This event is something beyond mere abstraction, that somewhat negative event in the soul. Even if we could create a good science of **human cultural functions**, which we see taking shape in mathematics in general, studies of harmonics, and of semantics (for which we propose to supply bibliographies at some future date), the processes

would still be largely within the confines of the individual. Beneficial religious experience, witnessed by ancients and moderns alike, are something quite beyond all of that. Until that further level can be contemplated as a theoretical principle unifying all mankind, we shall not have the universal required as foundation for a science of man.

Under these circumstances we would suggest, in place of any specific work on anthropology, as now understood, two simple works which make an effort to survey the whole field of human experience.

AN OUTLINE OF MODERN KNOWLEDGE, edited by Dr. William Rose, Grosset and Dunlap (by arrangement with G. P. Putnam's Sons), New York, 1931. In this book of 1054 pages twenty two specialists review each his own subject, informatively, critically, and significantly. The book has the rare merit of being well-planned, printed, and indexed. The writers make clear how much is yet to be established before we shall know very much about man and nature. The atmosphere is one of detachment from the confusion and fads and the journalistic fictitious certitude, which impairs the usefulness of many compilations. Sensationalism is here avoided. The general reader is brought from the topic's beginning up to a date well past the burst of revolutionary discoveries, which began about fifty years ago. The bibliographies at the end of each topic list, and occa-

sionally discuss, fundamental works of the greatest authorities, usually one book of each. The sections are: A. Science, Philosophy and Psychology, preceded by a philosophic and retrospect summing up views held up to the 19th century, and concluding with a survey of recent and contemporary philosophy (both by Professor A. Wolf, University of London). The topics in this section are: The idea of God, The Physical Nature of the Universe, Astronomy, The Nature of Mathematics, Biology and Human Progress, Sex, Psychology, Theories of Psycho-Analysis, The Beginnings of Morals and Culture, The Characteristics and Distribution of the Human Race, The Achievements of Archaeology. Section B: Economics, Political Science, and History. The topics here need no listing. Section C: The Principles of Literature and Art, the topics being Literary Criticism, Painting and Sculpture, Architecture, and Music.

THE OUTLINE OF SCIENCE, edited by J. Arthur Thompson, Putnam, New York, 1922, four volumes, is no less valuable than the foregoing volume, partly because of the generous use of excellent illustrations and the simplicity and directness of style. Together these two works constitute a good review of many important curricular topics in an atmosphere of philosophical implications well above the baneful stock-in-trade of popularization at the descriptive level, sensationalism.

We Know We Must Act

The search continues and must continue, for some over-all logic, some strong not easily broken frame, within which both school and college may fulfill their at once diversifying and uniting tasks. (From *General Education in a Free Society*, the Report of a Harvard Committee)

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The disintegration of education both reflects and causes the disintegration of society. The incredible achievements of specialized research and technology should not blind us to the fact that our knowledge of where we are going has not kept pace with the development of our means of transportation. (Robert M. Hutchins, Chancellor, University of Chicago, in an address to the Citizens Board)

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We are desperately in need of a new synthesis in liberal education—a synthesis which will work out a sound combination of the contributions made by the narrower disciplines. (Edmund E. Day, President Cornell University, in an address at Union College, Schenectady)

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Two statements should be made bluntly whenever one discusses the colleges in relation to the postwar world. The first is that the colleges see and understand that this is one united world. The second is that the

Let Us Then Begin

colleges must be propagandists for the intellectual and spiritual qualities that will enable free men to live out their lives in a world of justice and peace. (Charles J. Turck, President Macalester College, in an address at the University of Minnesota)

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This far there has been no attempt to measure the qualities of mind and heart which represent the motivations of the individual. A conscious effort to assess these qualities and to develop them is undoubtedly needed in the educational process. One of the significant changes ahead in higher education will be in this area. The need is so evident and the possibilities so great that the effort will undoubtedly be made. (O. C. Carmichael, President, Carnegie Foundation for the Advancement of Teaching, in an Address at Adelphi College)

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A world which is physically one is not yet morally and intellectually one. Who, if not the colleges and universities of the world, should lead in closing this gap? (From a report of a conference of educators held under the auspices of The Association of American Colleges)

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The confusion in higher education, like the confusion of contemporary life, is due to the conflict between values and ends. (American Council on Education Studies)

THE PHILOSOPHICAL BELIEFS OF LEADERS IN AMERICAN EDUCATION

A Study By Frank C. Wegener,
University of Southern California

The following pages afford the reader (1) a description of an important, just-completed survey of the beliefs of American educators, together with (2) the full transcript of the questions employed to elicit those opinions, and (3) in the author's own words, the summary and conclusions of the study.

E. B. Sellon

1. DESCRIPTION OF THE SURVEY

It is widely recognized that the great problem facing education today is the necessity of providing the student with basic concepts which will relate for him the various fields of experience and knowledge, so that he may have a valid philosophy of life with which to approach social and economic problems. Educators now face this fact. Yet it is true that one of the greatest impediments to the curricular integration needed to produce such concepts is the wide divergence in educational and philosophical beliefs among educators themselves.

Obviously, there can never be any over-all agreement as to the basic factors until some common ground is established upon which educators can meet in principle. But there are such dissimilar schools of thought competing for acceptance of their doctrines by American education that on the face of it no possible common ground would seem available. Pragmatic, neo-realistic, idealistic, Scholastic and Aristotelian beliefs—the most widely accepted categories today—appear in disagreement with one another, if not in complete opposition. Furthermore, these philosophical differences are fortified by the dissimilarities in teaching methods and objectives among educators. The essentialist believes in the conservation and transmission of social heritage to establish a firm cultural background for the student; the progressive believes the aim of education is to awaken and unfold the powers of the individual; while the traditionalist holds that education is an intellectual process involving the transmission of universal and absolute truth. Viewed from these categorical positions, it would seem that there is little possibility of arriving at any mutuality of opinion. Yet all agree that education needs to formulate a fundamental philosophy which most of its leaders can support, or the stalemate will have dangerous effects upon our whole culture,

It was with all this in view that Dr. Frank Corliss Wegener of the School of Education, University of Southern California, undertook in 1945 a statistical study of the philosophical beliefs of leaders in American education, with the specific purpose of discovering their metaphysical convictions, basic educational principles, and the degree of correlation between the various schools of thought. The method of the study was an objective, quantitative, nation-wide, random-representative survey in the form of a questionnaire which was carefully de-

vised so that the educators interviewed were challenged to respond to the logic of the statement. In order to circumvent any possible bias toward one or another recognized school of thought, there were no labels attached to any of the statements, and they were carefully phrased and grouped to eliminate any possible ambiguity.

This is the first time that a study of just this kind has ever been done, and it represents an original contribution to the solution of the educational problem. Related studies in the past are discussed. Manly Harper at Columbia Teachers College in 1927 conducted an investigation of the social beliefs and attitudes within limited aspects of education, and Claud E. Arnett made a similar study of American school board members in 1932, using Harper's technique and test. In 1933, Francis E. Peterson investigated the philosophies of education which were current in the preparation of teachers in selected normal schools and colleges. His survey was especially important—and even dismaying—in that it showed to a significant degree that teachers were then "not aware of the more subtle implications and assumptions which underlie the positions for which they declare themselves on various issues," nor had they "formulated a well-ordered, thought-out philosophic outlook in terms of which to judge problems and issues."* As a result of his findings, Peterson made the observation that teachers generally failed to reckon with the common elements of many of the problems and the logical conceptual connections among them. In other words, the respondents were not as consistent as they might have been. This devastating discovery did not receive the wide notice due it.

Following, in 1934, Merle Scott Ward made a study of the philosophies of administration current in selected liberal arts colleges, and a similar analysis made in the same year by Frederick Bair considered the social understandings of the superintendents of schools. There have in addition been two outstanding studies of the social beliefs of leaders in American education by Merle Curti in 1935 and Norman Woelfel in 1933. Woelfel, in particular, was engaged by many of the problems faced in Wegener's study. He was impressed with the enormous

* Francis E. Peterson, *Philosophies of Education Current in the Preparation of Teachers in the United States*, Teachers College, Columbia Univ., N. Y. 1933.

amount of literature devoted to theoretic educational issues, and by the fact that the philosophy of education had come to be increasingly a matter of pro-and-con discussion of these speculative issues, while the backgrounds of general philosophical thought were neglected. His general conclusions are interesting:

"(1) that the traditionalists have been overly concerned with the values of the social heritage, and (2) that some of the scientists were oblivious to social needs because of their devotion to science, and (3) that the experimental naturalists appear to understand what is going on in the modern world without becoming frantically desperate about the destruction of inherited values or over-enthusiastic about the possibilities of a science which has rejected philosophy . . . Experimental naturalists are not saviors; they are simply men who have done considerably hard disillusioned thinking."*

There is considerable similarity in the content of Woelfel's and Wegener's studies, but their purposes and techniques are entirely different, and their conclusions are also dissimilar. The time factor has undoubtedly a good deal to do with this. The state of mind of educators in 1933 and that of 1947, with World War II behind them, and all the implications of atomic energy before them, is necessarily different. Scientists have lately been very articulate in their concern about the social implications of scientific discovery. Moreover, the mere fact of widespread anxiety over the conceptual lack in American education is further testimony of a changing state of mind.

There are other striking features shown in Dr. Wegener's study. It has been commonly regarded that those who hold a pragmatic view of life are, on the whole, materialistic in their conception of the nature of man. But the study shows that the modern experimental schools of thought, though largely characterized by empiricism and relativism, reject materialism and agnosticism. It is also popularly supposed that idealists base their philosophy upon the fundamental assumption that the phenomenal world is fashioned upon the pattern or idea pre-existing in the mind of God. This might lead us to conclude that idealists hold to a static conception of the universe. Dr. Wegener's study has, however, disproved this assumption also. In reply to the statement: "Basically ours is a changing and evolving universe," a preponderance of the respondents indicated a definite belief in the dynamic quality of the cosmos. In fact, this belief rated the highest among the metaphysical principles discussed, about 93% approving the belief, and only 4% indicating real disapproval.

Even more striking were the replies to the statement: "Man is an essential unity of physical body and spiritual soul." Here there was a much greater affirmation than had been expected, since definite attacks upon such beliefs have been made by some educators who have urged a naturalistic view of nature and man. Yet 78% of the educators responding approved this statement of

man's spiritual nature, whereas only 10% definitely disapproved. Even the pragmatic group, which was expected to disapprove, rendered a 65% approval, of which 50%, or a majority, was definite approval.

The most important and encouraging conclusions emerging from Dr. Wegener's survey lie in the fact that there are philosophical concepts upon which educators can and do agree. A considerable number of these leaders have a tendency toward eclecticism, so that even while identifying themselves with a recognized school of thought, they are not so fixed in opinion as to be unable to approve principles more obviously pertaining to other schools. For instance, American educators on the whole tend to an idealism in keeping with American tradition, no matter what their formal philosophical allegiance. These are all encouraging signs. Yet the study equally reveals that upon many issues basically important to education, such as the nature of consciousness and indeed that of man himself, there are still critical differences.

This study is admittedly but the beginning of the great efforts which must be made towards the building of such philosophical concepts—a clearing away of underbrush, in order that the main objectives may be more clearly seen. Only by identifying the differences and agreements in educational thought can the problem be stated or even perceived. It is in this sort of clarification that Dr. Wegener has done a service to the cause of educational integration. The inescapable conclusions which derive from his study will be obvious from a reading of the summarizing chapter of his book which follows. But the full implications of varying philosophical beliefs, their differences and their points of contact, cannot be thoroughly appreciated without access to the careful and ingenious methods and the fruitful (and somewhat dismaying) conclusions of the whole inquiry. This volume, when published in its entirety and, one hopes, with generous extracts from the original supplementary discourses sent in by many respondents, will be a landmark in the literature of the philosophy of education.

The results show that Dr. Wegener quite correctly anticipated the importance of this investigation, saying to his selected leaders: "The inquiry presumes the following: (1) That critical world problems are creating unprecedented demands upon educational leadership. (2) That education is at the crossroads. (3) That educational progress demands a reasonable degree of agreement. (4) That vital decisions of policy and practice will depend to a large measure upon fundamental philosophical beliefs. An investigation of this type should be of value in various ways. Some of these might be: (1) To provide a statistical picture of areas of agreement, disagreement and indecision on basic issues. (2) To provide important clues in determining the directions of modern thought. (3) To provide education with possible evidences of unified thought on critical issues."

The questionnaire proper consisted of statements of belief, with a scale for each, from zero (meaning not clear), through five degrees of response: definite ap-

* Norman Woelfel, *Molders of the American Mind*, Columbia University Press, N. Y., 1933.

proval, qualified approval, undecided, qualified disapproval, definite disapproval. As a project of this kind does not allow space or time for definitions and refinements of terms used, and as words have many meanings to different people, respondents were asked to take the statements at face value and reply as they might in meeting such a statement in ordinary discourse.

We feel privileged to print herewith the questionnaire issued by Dr. Wegener in his study, reproducing the statements themselves in their entirety, and following that, also with the kind permission of the author, we make available also in its entirety Chapter X, the summary, conclusions and recommendations of the study.

E. B. S.

2. THE STATEMENTS OF BELIEF

1 Our universe is essentially purposeful. 2 Basically ours is a changing and evolving universe. 3 Man is an essential unity of physical body and spiritual soul. 4 One essential difference between man and brute is that man is rational and brute irrational. 5 Natural objects have a nature of their own independent of human knowledge. 6 Faith in God and in the traditional theologies have been made impossible for the educated mind of today. 7 Inherent in the universe is a true right and wrong; this is a universal principle for all time. 8 Some truths are obtainable by man only through Divine Revelation. 9 The only reliable criterion for the truth of an idea is that of practical application. 10 Man has the intellectual power of abstracting universal concepts from the particular objects in his experience.

11 The nature of man is such that he can be educated to get along with his fellow men in peace. 12 The primary principles of education are absolute and universal rather than relative and variable. 13 Education must be cognizant of the supernatural as well as the natural order. 14 The chief aim of American education should involve the transmission and inculcation of traditional values derived from our social heritage to the oncoming generations. 15 The fundamental purpose of the school is a systematic preparation of children for their ultimate places in our democratic society. 16 Educational content must be continually refashioned for a particular society in a particular place and a particular time. 17 Education is really a process of continuous reconstruction of experience in contrast to education as preparation for the future or as a process of unfolding latent powers of the individual. 18 In our public schools no instructor should be permitted to teach the superiority of any one doctrine on any controversial issue. 19 There is much to be said for the doctrine of formal discipline in education. 20 Basically ours is a dynamic universe and education must constantly change to meet the particular needs of the times.

21 Man is essentially a material and biological organism without supernatural or spiritual attributes. 22 Mind is more than a product of materialistic factors; mind has a spiritual nature. 23 Speculative philosophy which transcends the problems of practical living is pointless. 24 Primary reality consists of ideas or ideals which transcend human sense experience; these ideas are the true objects of thought. 25 Man possesses an intelligence which transcends a merely material concept of mind; this intelligence is derived from Infinite Mind. 26 For man there are no eternal truths; truth for man depends

upon what can be demonstrated in particular situations. 27 God created man; he created him for the purpose of man's happiness; this happiness is realized perfectly only in God. 28 Man can adjust himself adequately to his environment without consciously taking all reality into account. 29 Experience is the sole source of human knowledge. 30 It is extremely doubtful that man can have any knowledge beyond that which is demonstrable to his senses.

31 Man's greatest good lies in pleasure and the avoidance of pain. 32 The basic motive of man's acts is to be found in egoism or self-interest. 33 A concept is nothing more than a name which man has applied to a number of particular things which are similar in appearance or action. 34 No statement can be both true and false at the same time and in the same respect. 35 Scientific method should replace the metaphysical approach to the problems of education. 36 There is no knowledge which holds true regardless of past, present, or future contingencies of experience. 38 Truth is relative to time, place, and subject; it has no objective standard in nature. 39 Man is the measure of all things; and, all being and truth are relative to man as opposed to the idea of inherent standards in the nature of things. 40 Modern man would be wise to abandon his search for ultimate causes and the inner essences of things, and to turn his attention toward the findings of demonstrable science as the only facts both knowable and usable.

41 There is no such thing as instinctive, innate, or inborn knowledge. 42 The nature of ultimate reality, including the existence of Deity, is unknowable and the only defensible attitude to assume is that of confessed ignorance. 43 Matter alone is existent and real in our universe. 44 Modern scientific method has proved itself the only reliable means of discovering the realities of existence. 45 Man is the product of a biological process of evolution; as such he can be explained largely in biological terms. 46 Man can have hope for immortality because of the rationality and spirituality of the universe. 47 Democracy is not an end in itself but is only a means of achieving the maximum general welfare for the people. 48 The public elementary and secondary schools should be concerned primarily with general education and only secondarily with vocational education. 49 Our hope for world peace depends largely on how effectively we can teach the ideals and practices of Christianity and Democracy. 50 Modern education should emphasize a "man-centered" society as opposed to the medieval "God-centered" universe.

3. Dr. Wegener's Summary, Conclusion, and Recommendations

(Chapter X In It's Entirety)

I. SUMMARY

Statement of the problem. It was the fundamental purpose of this study to discover the metaphysical beliefs of leaders in American education. This investigator assumed that underlying the educational ideologies of the diverse schools of thought in education there were primary beliefs of a metaphysical nature. It appears to be of paramount importance to discover the degree in which the metaphysical principles of various points of view were supported by American educators. It was reasoned that a very definite correlation might exist between the educational philosophies and deeper convictions of a purely philosophical character. This line of reasoning led to a nation-wide investigation of the philosophical and educational beliefs of leaders in American education.

Importance of the study. This study is important for several reasons: there are numerous theoretical controversies within modern education of a serious nature; education obviously needs to formulate a fundamental philosophy upon which most of its leaders can agree in principle; such a desired philosophy cannot be properly formulated until the existing areas of agreement and disagreement in regard to basic principles are specifically located; in the absence of such information this study can be of immediate and practical aid by securing the necessary data; and finally, this study supplies data for a direct attack on this problem by educators by providing a comprehensive evaluation and presentation of the patterns of philosophical and educational beliefs of leaders in American education.

Terminology. The terms of this study have been defined adequately in Chapter I. However, it should be recalled this study embraces "educators" in the broadest sense of the word. It has not been restricted to "Educators" in the narrower or more technical meaning of the term. Also, this inquiry is a "metaphysical" investigation in the sense that an attempt has been made to discover the basic assumptions in a particular area of a particular group. The terms pragmatism, idealism, neo-realism, Scholasticism, and Aristotelianism have been employed in the sense described in the *Forty-first Yearbook of the National Society for the Study of Education*. These were regrouped by this investigator as follows: pragmatists and neo-realists as "Modern Experimental Schools of Thought," and idealists, Scholastics, and Aristotelians as "Traditional Rational Schools of Thought". A third classification was called "Intermediate Schools of Thought" which included eclectics and miscellaneous points of view.

Related studies. Much has been written about the theoretical controversies which exist in the field of educational philosophy. However, there have been only a few investigations of the actual philosophical beliefs of

educators. These investigations have been limited to philosophies of a social, political, or educational nature for the most part. It appears that there have been no nation-wide investigations of the philosophical beliefs in American education in the metaphysical sense of the present study.

Several investigations of the social beliefs and attitudes within limited aspects of education were inaugurated by the work of Harper at Columbia Teachers College in 1927. Harper's study was designed to inquire into the status of certain fundamental social beliefs and attitudes as included in the trait conservatism-liberalism-radicalism of American educators. Harper's study was somewhat similar to the present study in the use of objective technique to measure subjective beliefs. Arnett made a similar study of the social beliefs and attitudes held by American school board members using Harper's technique and test, in 1932. Another study which bears some similarity to the present study is that of Petersen which was made in 1933. Petersen investigated the philosophies of education which were current in the preparation of teachers in selected normal schools and colleges. Some of the statements which Petersen utilized overlapped with those of the present study. However, this was in such a small degree and in different circumstances that it did not constitute a repetition of studies. The purposes, content, and outcomes were quite divergent in nature. Scott's study of 1934 was somewhat similar in general technique. Scott investigated the philosophies of administration which were current in the deanship of selected liberal arts colleges. Another similar study worthy of mention is that of Bair in 1934. Bair made a study of the social understandings of the superintendents of schools and used the Harper test.

Using the technique of literary analysis of a few selected educators Curti and Woelfel have both contributed outstanding studies in the area of social and philosophical beliefs. Curti wrote *The Social Ideas of American Educators* which presents the social ideas of educational leaders of the nineteenth century. Woelfel wrote *Molders of the American Mind* which was an intensive study of the social views of seventeen selected leaders in American education. Although bearing some striking resemblances to the present study in the content of the studies the techniques and field of educators surveyed are quite different.

One of the best sources of educational philosophies in relation to the present study is that of the *Forty-first Yearbook of the National Society for the Study of Education*, Part I, "Philosophy of Education." This source was practically indispensable to the formulation of the check-list used in the present study. Other helpful texts and commentaries have been given full recognition in Chapter I of this study.

Although there were some studies of a generally related nature, there were no studies which anticipated the problem, content, and findings of this study. Consequently, this investigator feels that new and needed data have been discovered in the present investigation.

Procedure of the study. The general plan for this investigation called for the formulation of an instrument which would measure the various degrees of philosophical belief of the various schools of thought as indicated by leading educators. It was planned to conduct a random sampling of the leading educators in the entire United States in regard to their basic beliefs. The proposed check-list contained a scale of response which enabled the investigator to transmute the indicated beliefs into quantitative terms of an objective nature.

The construction of the check-list constituted one of the most critical phases of the study for the complete outcomes of the investigation depended upon the reliability of this instrument. An adequate scale of response was modeled after the one recommended by R. Libert in his *A Technique for the Measurement of Attitudes*. Reliable and representative statements were formulated and tested before final adoption. A graduate student jury and appropriate members of the educational and philosophical staffs assisted in the creation of an adequate instrument of measurement.

First principles representative of idealism, neo-realism, pragmatism, Scholasticism, and Aristotelianism were chosen. Other types of statements were included to make the study more balanced and complete. Educational principles of essentialism, progressivism, and traditionalism were represented to a limited extent. Other points of view such as naturalism, empiricism, rationalism, positivism, agnosticism, etc., were included. All in all the check-list represented a fair sampling of many contrasting points of view in both philosophy and education.

To insure a true random sample a mailing list was composed from the directory, *Leaders in Education*. Every sixth name was selected in an orderly, unbiased manner until three thousand leaders had been listed. The printed check-lists were mailed to the educators throughout the United States. Returns were received from one-third of the educators. The returns were tabulated, classified, analyzed, and interpreted. Patterns of belief were extracted from the findings and statistically correlated and corroborated.

Following the tabulation and statistical computation, the findings were subjected to a detailed analysis and interpretation which expressed itself in a variety of tables and statistical constructions. Each statement was analyzed individually as to its origins, meanings, finding and significance. After individual analysis the over-all patterns of belief were extracted. These operations led to the final consummation of all the materials in the summary, conclusions, and recommendations of the whole study.

Factual data. A few of the outstanding facts concerning this inquiry should be recalled at this point. Of the

three thousand forms mailed, over nine hundred were returned completely filled out for use. The representative character of the study was proved by the fact that all but one state was represented in the responses. Practically all fields of learning and all types of educational positions were represented in the responses. Analysis of the original directory, which was used for the sampling, indicated an average age of sixty-two years for the leading educators, with a range from twenty-eight years to ninety-eight years of age. The schools of thought were well represented with the exception of the Aristotelians who amounted to just 1 per cent of the total. However, it was assumed that it is quite possible that that figure represents a true sampling.

Summary of patterns of philosophical belief. Space does not permit a review of all of the summary remarks on all of the individual statements of belief. However, it is appropriate that the dominant patterns of thought be summarized briefly.

The pattern of philosophical belief of all respondents. The general pattern of over-all beliefs was characterized by eclectic and idealistic beliefs. The idealistic tendency dominated the pattern, but the educators were eclectic enough to choose from some of their favorite beliefs from all schools of thought which were represented. An admixture of the modern and traditional was evident throughout.

The over-all pattern includes the following concepts: a dynamic universe, a purposeful universe, the spiritual and rational nature of man, the ability of man to abstract universals, the law of contradiction, the principle of independence, the reality of externals, democracy as a means, the ideals and practices of Christianity and democracy, and the educability of man's nature for peace.

Their dominant pattern of philosophical belief does not include the following concepts: denial of traditional theistic faiths, skepticism of man's spiritual nature, materialistic metaphysics, the futility of metaphysical considerations, and the hedonistic principle of the good.

The over-all eclecticism of the educators is shown by the inclusion of principles and concepts from the following categories: idealism, naturalism, pragmatism, scholasticism, Aristotelianism, neo-realism, Christianity and democracy, essentialism and progressivism.

The majority of all educators object to: skepticism, materialism, positivism, and hedonism.

In general, the dominant pattern of thought among American educators is decidedly eclectic. However, their eclectic preferences incline toward idealistic and traditional beliefs rather than toward the modern naturalistic philosophical beliefs. Most educators evince a great respect for the scientific, experimental, and naturalistic, but they combine these beliefs with a strong inclination toward what might be termed the traditional, rationalistic, and transcendent beliefs. In short, their pattern of belief is a carefully selected middle-of-the-road position with a notable inclination toward the idealistic philosophy.

Pattern of philosophical beliefs of the modern schools of thought. The modern experimental schools of thought have a pattern of belief which is highly in accord with theoretical expectations. Their pattern of thought shows a definite devotion to empirical principles of thought. The beliefs are largely empirical in nature and tend toward skepticism and positivism. Relativistic epistemology is preferred to the absolutes of the rationalistic epistemology. They are particularly skeptical of scholastic doctrines. Concepts which emphasize man's faith in scientific method and a homo-centric civilization are dominant within their pattern of thought.

This point of view has been thoroughly expounded and completely summarized in a previous section.

Pattern of philosophical beliefs of the traditional schools of thought. The traditional schools of thought have a pattern of philosophical beliefs which is highly in accord with theoretical expectations. Their pattern shows a definite devotion to traditional principles of the idealistic, scholastic, and Aristotelian systems of thought. They exclude the modern relativistic epistemology and the humanistic emphasis on a homo-centric civilization. Instead, they seem to prefer an idealistic metaphysics and epistemology. Concepts of God, purpose, mind, and the possibility of rational truth seem to be dominant within their pattern of thought.

The pattern of philosophical beliefs of the Intermediate schools of thought. It is both theoretically and actually evident that the patterns of this intermediate grouping are irregular in content. The pattern reflects the views of the diverse classifications of educators who were included in the miscellaneous group. However, despite these facts, there is a pattern which indicates a definite trend toward the traditional beliefs. There is also a trend away from the extreme pragmatic and empirical beliefs. On the whole, it represents an eclectic position with inclinations toward traditional beliefs. The eclecticism is especially true in regard to educational beliefs where both conservative and progressive principles of education are approved.

The intermediate groups seem to oscillate between the beliefs of the modern and traditional schools of thought. This oscillation results in an average position which is almost mid-way between the two but does swing more in the traditional direction.

Statistical considerations. The conclusions from this study thus far have been corroborated by recourse to certain statistical calculations. The main statistical device which was used extensively in this study was that of the rank order of merit correlation coefficient. These rank order correlations were used to measure the relationship between the various schools of thought as revealed through their comparative rankings of the statements. These rankings were arranged in order of approval by use of a special formula which assigned point values to the various statements. The rank order correlation formula, as previously cited, was used to compute the degree of relationship and significance of the relationship.

Rather high degrees of relationship were discovered between the groups which have been termed (1) modern experimental schools of thought, (2) traditional rational schools of thought, and (3) intermediate schools of thought. Correspondingly low correlations were found between the schools which were logically opposed in philosophical concepts. Thus the statistical findings tended to confirm the logical expectations.

This investigator has not been particularly interested in the correlations as interpreted according to the "standard" values of such coefficients. He has been more concerned with the "comparative" coefficients of correlation as they have resulted from this study. In this respect, it is interesting to note that the eclectics and miscellaneous groups have the highest relationship to the over-all response; the traditional schools have the next highest relationship to all the respondents' beliefs; and the modern experimental schools have the lowest relationship of the three groupings.

Thus the statistical correlation coefficients have been helpful in justifying the previous patterns of thought which stated that the over-all pattern inclined toward eclecticism, idealism, and traditional beliefs from its middle-of-the-road position.

Analysis of the statistical factors reveals that the computed correlations have a significance as measured in terms of probability for the whole population of leaders in education.

II. CONCLUSIONS FROM THIS STUDY

Many conclusions have been already stated or implied previously in this dissertation. Some of them have been treated at some length or are obvious from the tabular data. In this section, the conclusions on the many subjects are necessarily presented very briefly. Complete explanation of each conclusion would necessitate almost as much space as has already been used. The reader will undoubtedly realize the extensive possibilities of this philosophical content.

The hypotheses of the study. Concerning the hypotheses, it is concluded that nine of the ten hypotheses were completely justified by the findings. One hypothesis was in partial error on two out of eight concepts.

The dominant patterns of philosophical belief. The following statements embody the dominant patterns of philosophical belief.

The majority of leaders in education favor a pattern of belief which includes principles from the following categories: idealism, naturalism, pragmatism, scholasticism, Aristotelianism, neo-realism, Christianity, democracy, essentialism, and progressivism.

The majority of leaders in education tend to object to some of the principles from the following categories: naturalism, skepticism, positivism, hedonism, and materialism.

Although most of the educators favor a nearly middle-of-the-road position, philosophically they tend more toward eclecticism, idealism, and traditional beliefs.

The modern experimental schools have a pattern of belief which is largely dependent on the following sources: empiricism, scientific method, skepticism, relativism, positivism, naturalism, and progressivism.

They depend to a less degree than the other schools upon these sources: rationalism, metaphysics, idealistic epistemology, supernaturalism, traditionalism, and absolutism in epistemology.

The traditional schools' pattern of belief depends upon: Platonic idealism, idealism, Scholasticism, scholastic teleology, Aristotelianism, essentialism, and traditionalism in education.

They tend to disapprove these sources: pragmatism, pragmatic humanism, empiricism, relativism, materialism, skepticism, positivism, agnosticism and naturalism.

The intermediate schools depend on the following sources: idealism, scholasticism, essentialism, positivism, and progressivism.

They tend to disapprove of these sources: pragmatism, empiricism, agnosticism, and sole reliance on science for man's truth.

Theoretical and actual beliefs. Concerning theoretical and actual beliefs:

There is a remarkably high relationship between the theoretical expectations and the actual beliefs.

Although educators identify themselves with various schools of thought, they tend to agree with many principles of other schools of thought.

Despite the theoretical lines of demarcation which exist, there seems to be a great fund of basic principles and beliefs on which most of the educators can agree.

Possibility of unity. Concerning the possibility of a unity of philosophical beliefs between educators it is concluded:

There are many metaphysical beliefs on which the majority of all educators of all schools of thought can and do agree.

Much of the disagreement might be eliminated if the educators were more familiar with the metaphysical principles themselves.

More unity might be achieved if the educators of different points of view made a concerted effort to eliminate the obvious points of difference.

Critical issues. Concerning the most critical issues discovered, it is believed that the problem of epistemology, or *how man knows*, if he knows at all, is one of the most critical causes of deviation among the educators. This difference is obviously more critical to education than anything else, for the educational processes must be based on some theory of knowledge. The age-long controversy concerning the empirical, rationalistic, and supernatural theories of knowledge seems to be the source of many critical issues in the present age; the struggle between those who favor relativism and those who favor eternal principles is evident.

The doctrine of Divine Revelation is also a critical issue.

The struggle between naturalism and supernaturalism is vital.

The conflict between positivists and those who uphold metaphysics and theology is critical.

The conflict between the proponents of skepticism and agnosticism as opposed to faith in transcendentals and theism is critical.

The conflict between a homo-centric civilization and a theocentric civilization is critical.

Pragmatism. Concerning the pragmatic point of view, it appears that the majority of leaders in education are not disposed toward the pragmatic position philosophically.

The majority of leaders seem favorably disposed toward a pragmatic and progressive education along with principles of essentialism.

The leaders in education are very definitely in favor of the pragmatic emphasis on the dynamic character of the universe.

Neo-realism. Concerning the realistic point of view, it seems that the majority of educators are favorably disposed toward the neo-realistic principle of independence of externals.

The majority of leaders are not disposed toward the realistic position generally.

Idealism. Concerning the idealistic point of view, it is concluded that the majority of educators are dominantly disposed toward the idealistic point of view.

Most educators seem to believe in a dualism of mind and matter.

Scholasticism. Concerning the scholastic point of view, it is concluded that most educators are not particularly disposed toward scholasticism generally.

Most educators do agree with the scholastics on the essential spirituality of men.

The scholastic doctrines are a source of much disagreement among the educators philosophically.

Aristotelianism. Concerning the Aristotelian point of view it is concluded that the educators are definitely disposed toward several Aristotelian principles.

The educators are not particularly disposed toward the Aristotelian point of view generally.

Eclecticism. Concerning eclecticism, it is evident that the educators are dominantly eclectic in their beliefs.

The educators are decidedly eclectic in educational views also.

Materialism. Concerning materialism, it appears that most educators tend to disapprove of a materialistic philosophy.

Positivism. Concerning the positivistic point of view, it seems that most educators are not disposed toward the positivistic point of view.

Naturalism and skepticism. Concerning the naturalistic and skeptical points of view it is concluded that

most educators are not favorably disposed toward these points of view.

Theo-centric versus homo-centric education. Concerning the comparative emphasis upon theo-centric or a homo-centric education, it is concluded that the educators are divided on this issue along categorical lines of demarcation according to their respective philosophical schools of thought.

Indoctrination in education on controversial issues. Concerning the belief in the desirability of indoctrination on controversial issues, it is concluded that the leaders in education are evenly divided on the desirability of indoctrination in education on controversial issues.

Democracy as a means. Concerning democracy as means, it is concluded that practically all educators are in favor of the functional concept of democracy as a means to an end in itself.

Christianity, democracy, and peace. Concerning the ideals of Christianity and democracy it is concluded that most of the educators favor the dissemination of these combined ideals and practices as a contribution to world peace.

Men and peace. Concerning the nature of man it is concluded that most educators believe in the essential rationality of man and in his educability for peaceful living.

Faith in God. Concerning the theistic belief it is concluded that most of the educators are dominantly disposed toward theistic beliefs.

III. RECOMMENDATIONS

This investigator does not wish to transcend the reasonable limitations of objective research. However, it does seem entirely feasible that some practical recommendations should emerge from the data and conclusions achieved in this nation-wide study of the beliefs of leading educators. One of the primary purposes of this investigation was the desired realization of the present beliefs of educators which might be utilized in turn to furnish the nucleus of a unified philosophy of life and education.

Educational study. It goes almost without saying that education must have a greater unity of belief if there is to be progress. The evidence advanced by the findings of this investigation shows that there is a direct correspondence between the educational philosophies and the underlying philosophical beliefs. In other words educational beliefs are dependent to a large extent upon philosophic beliefs, and educational unity cannot be advanced until there is substantial agreement with the underlying philosophical conceptions. Logically then it appears that educators should proceed to the root of the matter if a greater unity is to be achieved. Thus the first recommendation growing out of this study is that educators should become critical of their primary philosophical beliefs as well as their more immediate disagreements within education.

Realization of common beliefs. The first step proposed is the realization of the common beliefs which already exist among educators of all schools of thought. Much has been written about the necessity of erecting a sound philosophy of education. Where should this construction begin? The plausible answer to this question seems to lie in the here and now. It is obviously necessary to begin with the actual beliefs which are held by most educators at the present time. An insight into the extent of agreement upon philosophical principles has been provided by this investigation. It should be recalled that the findings revealed that educators of all schools of thought were in majority agreement upon 40 per cent of the principles presented to them. Although this study represents a mere sampling of belief, it does seem to illustrate the extent to which agreement might be said to exist. With the exception of some expected deviations in either direction, it seems probable that a nucleus of about 40 per cent of the underlying philosophical principles of the several schools of thought could be accepted in a qualified manner by most of our educators. The exact degree of agreement is not too important at this point. However, it is vitally important that educators recognize that there is considerable agreement on fundamental philosophies. The principles agreed upon in this study should be noted as a beginning point. Further examinations should be made to determine many other principles of possible agreement. Subsequently education would be making valuable progress toward the realization of greater educational unity.

Analysis of principles of disagreement. After a realization of common principles there should be an intelligent analysis of the issues of disagreement. This analysis should involve (a) the discovery of semantogenic disagreements and (b) the discovery of actual disagreements. The evidence produced in this study and in related investigations suggest that many of the disagreements on fundamental issues among educators are semantogenic rather than actual. In other words the principles enunciated in philosophical controversies are in all likelihood being discussed on various levels of meaning and intention. On the other hand there may be many disagreements which are real and not based upon misunderstandings of first principles. In either case it seems that a dialectical analysis of these principles of disagreement is seriously needed among leaders in education. Thus educators must familiarize themselves with the various points of view in educational philosophy other than the one or two schools of thought preferred by virtue of familiarity. The statement of the *Forty-first Yearbook of the National Society for the Study of Education* that most educators are probably not informed on more than one or two schools of thought at most is undoubtedly true. If educators are to formulate an intelligent and sound philosophy of education, they must endeavor to become better acquainted with the various schools of thought. Semantogenic disagreements cannot be distinguished from actual disagreements until there is a veritable meeting of the minds on the comprehension of the meanings of these fundamental prin-

ciples. Educators can no longer afford the luxury of adhering blindly to one school of thought on these issues but rather must become intelligently aware of what the other schools of thought are saying. This acceptance means a reiteration of the doctrine of suspended judgment on controversial issues until all the evidence has been surveyed and comprehended. Unity of philosophical beliefs in education depends upon a synthesis of the existing beliefs; this synthesis can be achieved only by exchanges and concessions on these issues which in turn demand a philosophical understanding the principles under consideration.

Summary. The recommendations which follow are not necessarily original with this study. They may agree or disagree with recent developments in the field of educational philosophy. They are, however, direct inferences from the findings and conclusions of this present study in the opinion of the investigator. Accordingly the following recommendations are stipulated for consideration in reference to the problems of educational philosophy:

1. The interdependent relationship between the principles of philosophy and the theories and practices of education must be realized more completely.
2. The metaphysical principles and ideological assumptions which underlie educational theories and practices must be critically examined.
3. Present educators and prospective educators

should be well informed concerning the diverse schools of thought in regard to philosophical principles.

4. Educators should become cognizant of the principles upon which there is agreement, disagreement, and indecision.

5. If a greater unity in philosophical thinking is to be achieved, there must be a careful examination of beliefs to segregate (a) semantogenic and (b) actual differences.

6. In view of the fact that educators are eclectic in their philosophical beliefs there should be a critical inspection of these principles to eliminate those doctrines which are inconsistent and diametrically contradictory.

7. Educators should strive deliberately toward the creation of a synthesis of those principles from the various schools of thought which may survive critical evaluation.

8. Education must utilize the broad principles of philosophy to integrate the diverse fragments of educational science and theory into an intelligible and unified whole.

Conclusion. In conclusion it appears to this investigator that education must achieve a greater familiarity with the philosophical principles of the several schools of thought if a greater unity in educational policy and practice is seriously contemplated.

VARIOUS VOICES

Without a basis in cosmology or a world synopsis, we cannot understand even the anthropological situation. (Donald C. Williams, Professor of Philosophy, Harvard University, in *The Harvard Educational Review*)

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Recent developments in science and philosophy are tending to converge upon an outlook on things which constitutes, or at least foreshadows, a great new synthesis. (Professor T. M. Forsythe)

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The voice of science is not a harsh song of triumph of inorganic mechanism over spiritual illusion; it is a gentler strain, falling gently on our ears from the mystic unknown — like a tune played by the picture of Nobody. (Sir Arthur Eddington, in *Philosophy*)

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Physics and mathematics are important for the community firstly, because they fecundate technical development and secondly, because, like all finer cultural endeavors, they are efficient counter-weights against the dangers of sinking into an odious materialistic attitude which leads to the predominance of unrestrained selfishness. (Albert Einstein in *Free World*)

Not the least aspect of education is to see that principles are adequate to changing needs . . . We can no longer afford the kind of aggression which makes power other than a means for the well being of society and society conceived as the whole of mankind. (Felix Frankfurter, Justice of the Supreme Court)

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Right education, in this day as in any other, will be the education which holds unashamedly before the student, the hope of the great community. Such an education will demand of all its students and teachers a new dedication to the life of the spirit. (Stuart Gerry Brown, Professor of English, Grinnel College)

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In the perspective of the strange new age which is breaking around us, the challenge of democracy to humanism is a trumpet call for action to which able and imaginative young men are now responding. The development of the concept of general education in many colleges, provides an opportunity for their talents. (James B. Conant, President Harvard University)

THE FOUNDATION FOR INTEGRATED EDUCATION

ANNOUNCEMENT

I *A New Teaching Mission*

The Foundation for Integrated Education is in process of incorporation. Upon completion of legal formalities, the names of its initial sponsors, directors, executive officers and other particulars of establishment will be announced in these pages.

The Foundation's special function among other educational institutions and associations is to concentrate attention upon the manifest, urgent and admitted duty in our times to develop a valid conceptual background for accumulated knowledge, so that ethical, political, economic and social strengthening may result.

We use the term *concept* to mean the product of that mental gift, peculiar to mankind, which permits us to recognize the attributes common to many entities. We are thus able to detect meaning and system, and to express this as harmonious relations. Since the freedom mankind enjoys depends in an important way upon this ability to classify and hence alter environment, both physical and psychological, it follows that the development of conceptual skills is of prime importance in a liberal education. If the student is to learn to stand alone, exercise his freedom, and enjoy his dignity, how is he to act except upon principle? Inherent in concepts, therefore, are all our hopes to confirm and enlarge freedom through education.

That the effective organization of liberal education upon such good terms will benefit us nationally follows directly. Confusion, fear, and insecurity are widespread, and what constitutes wise conduct in today's complex society is uncertain. Good will is by no means enough in itself to result in ethical action. Once the true character of man's constitution and his relation to nature are better understood and taught in a general educational movement democratically achieved, and his dignity and personal responsibility are restored as intelligible doctrines related to over-all principles, the young citizen—acting with his fellowmen upon principles universally conceded and confirmed by a conceptual education experienced in common—can and will enter economic, political, and social existence knowing how to do that which he knows it is right to do.

The Foundation is officially concerned only with its educational responsibilities. Its effect upon other institutions of human society is determining solely by the enlightenment it may help to bring to our confused age through that ordering of knowledge which is so long overdue.

Scholars participating in the work of the Foundation are not bound by the studies conducted, supervised, or published under its auspices, although the development of all methods, studies, and concepts will be governed by the Council of the Foundation. Official descriptions

of the organization and aims of the Foundation published below, and as amended from time to time, may alone be taken as receiving concurrence of participants. Since descriptions of aims and assumptions must necessarily be in such general terms as will fit the broad intent of the organizers, it may be desirable to provide a preliminary brief discussion of the motives of the incorporators.

II *Our Immediate Opportunity*

The Foundation comes into existence because its organizers have been convinced by experience that general concepts can be validated today by exact and acceptable techniques, such as have been outlined in earlier pages of *MAIN CURRENTS*, and by other methods.

Concepts are commonly possible if rational, aesthetic, valued, and experimental elements be shared widely in educational experience. The projects of the Foundation therefore include special studies of the principles of the arts, the universals of philosophy, the values of comparative religion, and the laws of nature as formulated in the sciences. There is nothing novel in such studies, but the Foundation may be expected to do thorough work in the field, and it will have a special modern advantage. The actual materials of contemporary art, the demands made upon philosophy today, the present status of the religions fraternally and internally, and the new scope of science are all subject to remarkable circumstances not hitherto present. Thorough re-valuations are forced upon us by such notions as space-time, field studies in physics and biology and psychology, psychosomatic, general semantics and many other gains, and this host of developments simultaneously presses upon us imperatively *the sense of an immanent whole* framing each phenomenon. The new world of thought is thus great in significance and promise, as contrasted with European learning up to the eighteen-nineties, much as the round earth of the sixteenth century was large and liberative to the fifteenth century man with flat-earth ideas.

The foregoing considerations show that the work of the Foundation is not likely to be repetitious, artificial, or merely a skillful improvisation of descriptive surveys, however general its purposes may seem to be. Today precise methods and rigorous techniques can be applied to comprehend all knowledge and experience, and hence we may reasonably expect correspondingly firm and highly significant concepts to emerge. This prospect of gaining exact, authoritative, and stimulating results may properly be kept in mind while reading the following agreed-upon Aims and Assumptions.

III *Statement of Aims*

To collect, create and distribute authoritative instructional materials which will encourage the development of unified over-all concepts in education; to improve the balance of relationships between the physical sciences and the social sciences; to inquire into the phenomena of purposive activity in nature, man, and the universe.

To assist teachers to understand and use such materials, and to develop an active, realistic, comprehensive philosophy which will communicate to their students the unity, coherence, and beauty of the world in which we live.

To remedy, solely by such educative measures, the conceptual and hence the ethical, social, economic and political breakdown of our times, looking to a peaceful world order.

IV *Some Assumptions*

The terms *education* and *teaching* are here interpreted broadly to apply to all aspects of the learning process, although emphasis is put initially upon this experience in school and college.

The Foundation is primarily concerned with gathering and making available required source data, illustrations, principles and the like, which will ordinarily receive general assent as valid and important, and essential to a useful philosophy of the good life.

In consonance with this function, the methods of the measurement sciences will be employed wherever possible, and their content, the laws and orders of nature, will be a conspicuous feature of the source materials.

The specialties of religion, art and philosophy are not less realistic, each in its own way, and their verities, principles and universals will be identified.

The Foundation will not have to repeat those works which are the duty of scholars and associations of science, art, religion and philosophy, but will usually draw from them the materials for a common intellectual, experiential and verbal discourse, which, over a period of time, can form a philosophy for a truly American culture, and an American ideology to contribute to the achievement of a peaceful world.

As the Foundation is concerned with source materials, and is not responsible for the formation of any doctrines, arbitration of opinion is expected to be a minor feature of its work. That is, the Foundation, in consonance with freedom, will gather and disseminate well-founded studies which have conceptual significance, leaving to the individual the shaping of such material into his own life and thought.

It will, however, be readily understood that the work of the Foundation will imply a special interest in *order*, in all its aspects, since concepts, classification, paradigms and the like depend upon ordering.

It is also inevitable that studies of religion will be done at the comparative level, and lead eventually to a

kind of normative structure which will receive assent as a high outworking of principles seen in part at other levels.

In the same way, the principles of the arts and the universals of philosophy will be conspicuous, since these bring the arts and philosophies together and make possible not only their mutuality but their consonance with science and religion.

It is also evident that since these cultural moods have their source (whatever their primal origin) in human nature, and seem to advance through exercise of freedom and originality, the study of man and his nature will be a vital element in the program of the Foundation. Into this aspect of the work ahead all other findings will enter in a new and effective way.

The eventual results of such studies will be a better understanding of the common inherence of nature and of man in the universe, and hence we may expect to vitalize a synoptic view of cosmos.

The studies projected will take a special advantage of recent advances in electronic physics, resonance chemistry, mathematical astronomy, systematic geology, reinterpretations of crystallography, genetics and symbiosis and taxonomy and much else in biology, all forms of psychology, new techniques in mathematics, semantics and harmonics, and all other fields.

But as man has been projecting his powers in art, philosophy, religion and science out into family, economic, social and political life for ages, the records of history, archaeology, anthropology and mythology contain a great wealth of expression which cannot be supplanted, however richly supplemented, by recent theory.

And besides both of these results of evolution to date (historical gains and recent theory), there is the yet unexpressed potential or the unemerged future to concern us, and this is a practical way. For if we discover pattern out of the past we shall be able to project in some measure the shape of things to come.

The Foundation has no official concern with partisan political, economic, social or domestic causes. It is engaged solely in the search for truth, great truth. Its work can reasonably be expected to have effect upon all life and human activity, since the discovery, and especially the conscious use, of law is the determinant of freedom as a practical affair; and there are laws and orders in all fields of human endeavor which, known and used, will confirm and enlarge freedom. In that sense, and in that fundamental sense alone, the work of the Foundation may have powerful, beneficial, and could even have dramatically rapid effect upon family life, the community, the state, and world society.

V *Structure of the Foundation*

The Foundation will be governed by an Advisory Council of scholars. Its sponsors and active participants are being drawn from learned institutions in all parts of the world, but initially in the main in the United States. The Council will act in the interests of that much larger list of sponsors and citizens gener-

ally feeling the demands of our times. As the tasks of the Foundation are educational in character, the responsibility for making policy and guiding studies must and shall be vested in experienced educators.

In order to ensure continuity of activity, the Council will delegate the execution of its approved program to an executive group, which will implement the studies and supervise the publications of the Foundation. A director, assistant director and other consultant and staff officers will carry out these duties.

The Council and Executive will receive frequent assistance and guidance on the practical side from the Board of Directors of the Foundation, in charge of the conservation and enlargement of the Foundation's resources.

Associated with the foregoing will be special public relations counsel, determined by the peculiar purposes and needs of the Foundation. As an educational body, its work may be expected to have immediate use to institutions of learning. As an institution stimulating thought and especially conceptual thinking, the Foundation may be expected also to have marked influence upon national affairs, by means of the mere cogency of its publications. The public relations duties are therefore of a special character, and have a peculiar importance.

No less important is the role of treasurer. The tasks of the Foundation are prodigious, and the time and funds required to make the gains contemplated must necessarily be large. In truth, the work is in need of unlimited funds. The treasurer will be expected to take an active part in the shaping of the course of events under the policy laid down by the Council.

The usefulness of the studies which the Council will guide may be expected to be seen in three special fields, and for each of these a full-time counsellor is contemplated.

Centrally, the effect of the Foundation will be directed to the curriculum and the methods of education required to make the new material useful. For this purpose a curriculum counsellor will function.

Another result will be seen in the life of communities. As the studies of the Foundation begin to have effect, first in colleges and then in schools, they will necessarily prove stimulating to parents and citizens generally. Schools, in fact, will become increasingly useful as centers for adult education, and as community centers for cultural purposes. The Foundation, through its community counsellor, may be expected to be helpful along such lines.

A third consequence of primary importance may be expected in connection with commerce and industry. Everyone is aware of the effect of universal literacy upon the mass-production potential. American production would have been impossible on the recent scale seen during the war had not a certain general level of education been nearly universally available. It should be equally clear that any achievement of a general advance into a better conceptual atmosphere is bound to affect for the better the whole production complex. To

assist in this area, a counsellor for commerce and industry will be important.

VI *Present and Future Services*

The Foundation may reasonably be expected to be a legal entity and functioning late in 1947. In order to make its assistance available as promptly as possible, the provisional executive is arranging for visits with special committees for integration and with faculties as a whole, first upon campuses and with associations already actively collaborating with the Foundation. The visits give opportunity to discuss techniques and possibilities. Where circumstances allow, instructional materials precisely pertinent to the methods mentioned in foregoing paragraphs may be shown. The materials constitute a promising beginning of a Survey of Knowledge in visual form. By these means, progress becomes possible from the beginning.

The initial intent is that faculty members, and especially curriculum committees, shall be convinced that systematic work and steady progress is possible, resulting in exact conceptual gains to be incorporated in faculty planning of courses of study. The visitor from Foundation Headquarters is not at present concerned with setting up a course of study for undergraduates, but participation of students of senior intelligence is stimulating. An address to the student body also proves to have orientation value.

MAIN CURRENTS serves, and is expected to continue to serve, as the regular means of communication for the Foundation.

In due time, courses of study will be offered to teachers, at first in New York City and during summer sessions at appropriate points. The Foundation serves as liaison for cultural centers of arts and learning, and advantage will be taken of these connections to make new materials available in advance of general publication.

The Foundation will make a library appropriate to its purposes, and special instructional materials, available in New York City.

After suitable consultation, and under guidance of the Council, special studies will be projected in order to fill, with data, significant gaps in contemporary knowledge which have contributed to the conceptual breakdown. Even to identify gaps will be useful. These projects will be supported with Foundation funds upon suitable campuses co-operating with the Foundation in the Survey. Similar arrangements will be made for projects in educational methods, experimenting in the teaching of concepts which can be fully possessed by faculty members and effectively communicated to students as a natural part of diversified subjects. These projects will be contrived and conducted in every instance under the general direction of the Foundation's governing body, and guided by its executive in an atmosphere of completely free inquiry. The Foundation has no formal doctrines to advocate, but is committed solely to the elucidation of generally acceptable principles, laws and concepts.

The Foundation will serve as a clearing house for institutions of learning which have come to be concerned with progress along these lines. It will be a center where reliable information can be obtained by other agencies of public information.

The Foundation will aid the cultural purposes of the UNO and UNESCO, by special activities, tours, exchanges of visitors, directed along the lines of its particular duty.

As noted above, when the instructional materials, the Survey and other teaching services are well progressed and widely known, the Foundation will extend its work along lines of adult education into communities, and will also assist the world of commerce by bringing its resources in learning to bear on the peculiar educational needs of industry which have arisen through mass-production. In these activities the Foundation stands ready to co-operate with every major institution serving the country in ways parallel to its own course.

VII *How the Individual Can Help*

The times being as they are, and the work of the Foundation being urgent, the question may be raised: How can the individual assist to promote this work?

The readers of MAIN CURRENTS will be kept in touch with the developments. Subscriptions are solicited, especially to institutional libraries. It is therefore suggested that for the time being *subscriptions* be made business of first importance. In the case of college libraries, a simple request may not be enough, for though some librarians may see the immediate and urgent nature of this work, to others it may appear to

be only of general philosophical import. The department head or other responsible faculty member making the request for a library subscription would assist us by seeing the library subscription actually put through. Questions from Librarians in a position to subscribe on their own initiative will, of course, be welcome.

Individual subscriptions and gift subscriptions are also useful extensions, provided the recipient has an active interest in the purposes of the journal.

Friends of this work also serve effectively by making its existence known to editors of other journals, inviting announcements of the Foundation, and suggesting exchanges to editors. It should be evident that the Foundation staff must eventually sift systematically the chief learned journals, not in imitation of the Abstracts published in various fields, but with no less comprehensiveness reporting conceptual developments, or advances of general meaning to thought. Hence the friendliest relations with sister journals is important. In many learned journals the conceptual needs of our times are now frequently reflected. These effects will have firmer outlines as the work of the Foundation expands.

The editor of MAIN CURRENTS, acting on behalf of the provisional executive committee during legal formation of the Foundation, will be glad to hear from any individual who cares to take part in the program described. He may be addressed, for this purpose, simply: The Editor of MAIN CURRENTS, Port Chester, New York.

August 21, 1947